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**1989 CROP**

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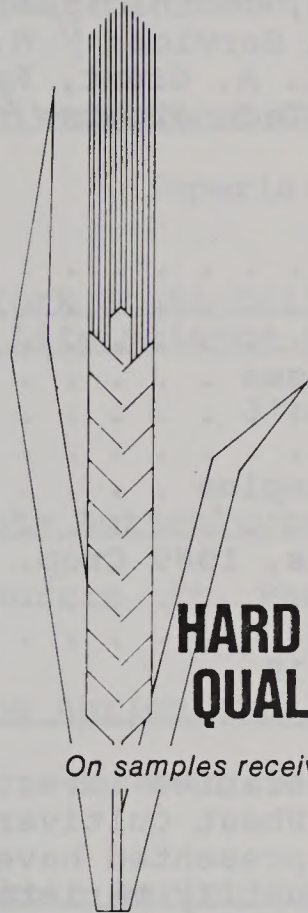
# **HARD RED SPRING QUALITY REPORT**

*Physical, Chemical, Milling, and Baking Characteristics*

United States Department of Agriculture  
Agricultural Research Service  
North Central Region







## HARD RED SPRING QUALITY REPORT

*On samples received from the 1989 crop*

### Source:

Spring and Durum Wheat Quality Laboratory  
USDA, Agricultural Research Service  
Harris Hall, N.D.S.U.  
Fargo, North Dakota 58105



QUALITY EVALUATION OF  
HARD RED SPRING WHEAT CULTIVARS

1989 CROP<sup>1/</sup>

by

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1/ This report represents cooperative investigations on the quality of Hard Red Spring Wheat Cultivars from the 1989 crop. Some of the results presented have not been sufficiently confirmed to justify varietal release. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. This report is primarily a tool for use by cooperators and their official staff and to those individuals having direct and special interest in the development of agricultural research programs.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for use of their facilities and the services provided in support of these studies. The report is not intended for publication and should not be referenced in either literature citations or quoted in publicity and advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

2/ USDA/ARS Hard Red Spring & Durum Wheat Quality Lab., NDSU

3/ Dept. of Cereal Science & Food Technology, NDSU.

1989 COOPERATING AGENCIES AND STATIONS

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1989 spring wheat samples were received are listed below:

University of California, Davis

Imperial Valley

New York State College of Agriculture  
and Life Science Cornell University

Ithaca

Minnesota Agricultural Experiment Station

Crookston, Morris, St. Paul, North area, South area

Montana Agricultural Experiment Station

Bozeman, Sidney, Havre

North Dakota Agricultural Experiment Station

Fargo, Minot, Langdon, Dickinson, Williston, Carrington

South Dakota Agricultural Experiment Station

Redfield, Brookings, Selby

Idaho Agricultural Experiment Station

Aberdeen, Teton

Wyoming Agricultural Experiment Station

Sheridan, Powell



1989 COOPERATING AGENCIES AND STATIONS (cont.)

Washington Agricultural Experiment Station

Pullman

Wisconsin Agricultural Experiment Station

Madison



A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, et al., Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1989.<sup>4/</sup>

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<sup>4/</sup> Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1989. Agricultural Research Service, U. S. Department of Agriculture and State Agricultural Experiment Station, St. Paul, MN.



## INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States are milled each year by the USDA/ARS, Wheat Quality Laboratory. The flours are assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators and other interested parties, quality data on the standard varieties and new strains of hard red spring wheat from the 1989 crop.

The same general format and techniques were used in evaluating the wheat as outlined in quality reports from previous years. The same computer scoring system has been used for the past several years, hence some faulting values differ slightly from earlier years. In general, data contained in this report are comparable to data in past reports and, where applicable, average results and average results from previous crop years are compared. The area averages are tabulated for the Uniform Regional Nursery varieties of Butte 86, Era, Chris and Stoa. A five-year average (5-YA) and the averages for the individual five years include all selections grown in the Uniform Regional Nurseries for that year. These results provide a comparison of individual years and the influence of environment on the crop. The actual crop characteristics may be somewhat different due to differences in varieties, but the change from year to year is applicable.

The evaluation of a sample involves three areas of analysis: kernel characteristics, milling performance, and baking evaluation. A brief description of testing methods is shown on pages 9 to 11 of this report. Various characteristics and any outstanding features or deficiencies of each cultivar are evaluated from results of these tests. No specific comments are made regarding mixogram patterns derived from samples. However, reference mixograms, shown at the end of this report, illustrate ranges from which sample mixograms may be compared.



## SOURCE OF THE 1989 CROP SAMPLES

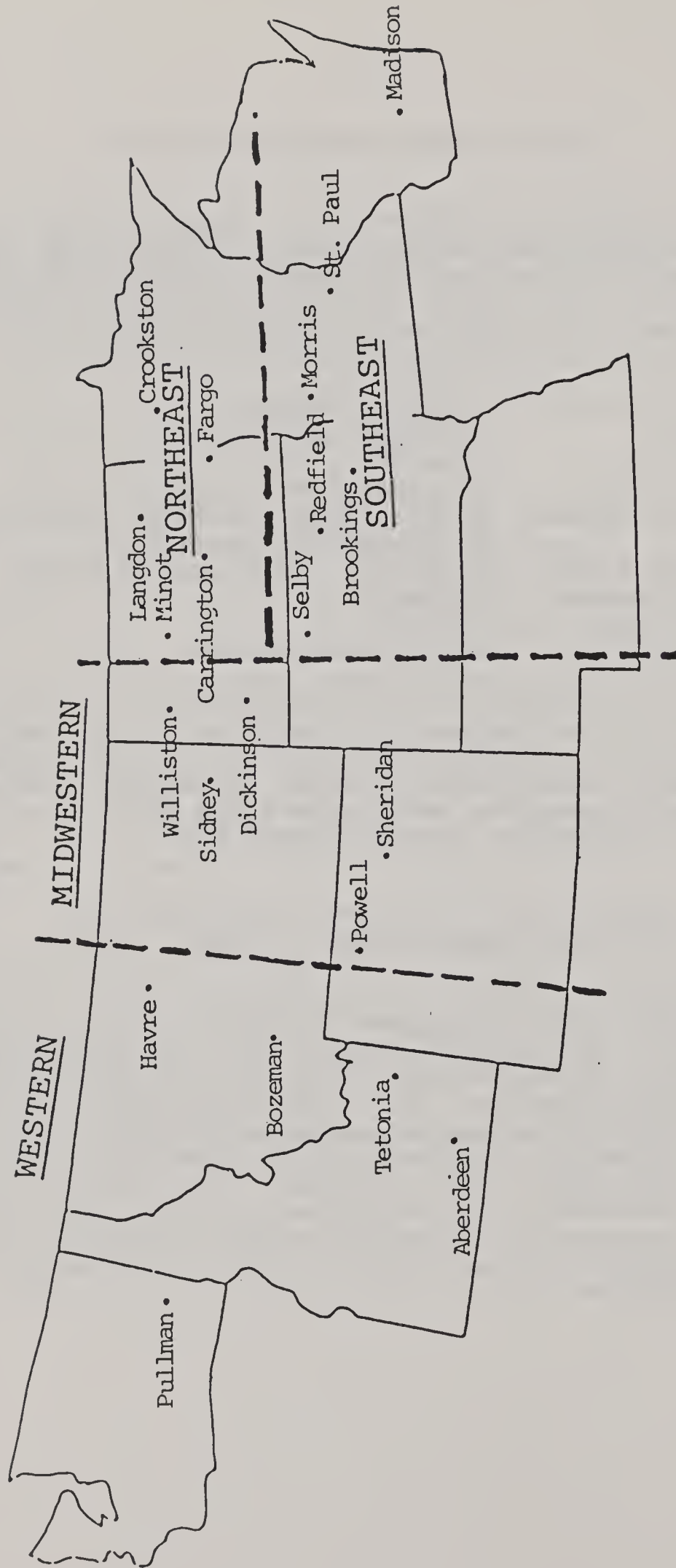
Tests were performed on 1,659 samples. However, data on 927 samples are not included in this report, because this information was of interest only to plant breeders at specific experiment stations. Data presented in this report are from the Field Plot Nursery and the Uniform Regional Nursery. Wheat samples came from the following 22 stations in 9 states:

California:	Imperial Valley
Idaho:	Aberdeen and Tetonia
Minnesota:	Crookston, Morris and St. Paul
Montana:	Bozeman, Sidney and Havre
North Dakota:	Fargo, Minot, Langdon, Dickinson, Williston and Carrington
South Dakota:	Redfield, Brookings and Selby
Washington:	Pullman
Wisconsin:	Madison
Wyoming:	Sheridan and Powell

Samples received from Arizona and California were from Field Plot Nurseries and are not included in the following Uniform Regional Nursery discussion. Spring wheats included in the Uniform Regional Nursery trials along with the variety or cross, the station that developed the variety, and the state selection number or C.I. number are listed on page 8.

## BLENDING AND AVERAGING PROCEDURES USED IN THE UNIFORM REGIONAL NURSERY TRIALS

The geographical areas from which the samples were received are shown on page 7. The Western, Midwestern, and Northeastern areas were comprised of five stations each, and the Southwestern area had six stations (see map p. 7). Individual wheat samples from the Uniform Regional Nursery originating from the four geographical areas were blended according to area. Milling performance, mixograms, and baking data were obtained from these area blends. However, data for kernel characteristics were arithmetical averages of individual sample analysis. Data from the Uniform Regional Nursery were compared with averages from the previous four years.



Wheat blends were made according to the geographical areas shown above.

Data derived from Field Plot Nurseries are obtained from individual wheat samples.



ENTRIES IN  
THE UNIFORM REGIONAL HARD RED SPRING WHEAT PERFORMANCE NURSERY

The 30 entries in the 1989 URHRSWPN are listed below:

Entry No.	Cross or Variety	CI No. or Selection No.	Year Entered	Source
1.	Marquis	3561	1929	Canada
2.	Chris	13751	1969	USDA-MN
3.	Stoa		1987	ND
4.	Era**	13986	1972	USDA-MN
5.	Butte 86		1987	ND
6.	Butte*2/6549-8-101-6//SS8010	SD3005	1987	SD
7.	ND572/SD8025	SD3014	1988	SD
8.	WS25/James//F4Bulk/6/Agent /3/ND441/Waldron/B/4/Butte/5/Len	SD3026	1989	SD
9.	SD2944//KS73H487*2/Fred/3/SD2854	SD3032	1989	SD
10.	Wheaton/Brule//SD2881	SD3036	1989	SD
11.	MN73167/MN81070	MN85324**	1988	USDA-MN
12.	MN75165/MN81012	MN86018**	1989	USDA-MN
13.	Wheaton/MN81129	MN86151**	1989	USDA-MN
14.	MN82013/MN7529	MN86329**	1989	USDA-MN
15.	MN82115/MN81070	MN86383**	1989	USDA-MN
16.	Stoa's'/ND617	ND650**	1988	USDA-MN
17.	Stoa/Amidon	ND652	1988	ND
18.	ND573/4/ND517/3/Olaf//Waldron*2 Agent	ND653**	1989	ND
19.	Stoa's'/ND617's'	ND655**	1989	ND
20.	Stoa's'/ND620's'	ND658	1989	ND
21.	HS82-448/Angus	HS85-902**	1988	NAPB
22.	HS81-0111/Era	N86-370**	1989	NAPB
23.	HS80-0401/PR2360	N86-903	1989	NAPB
24.	HS80-315/MN73167	HS85-476**	1988	NAPB
25.	MN73167/Probrand 711	HS85-674**	1988	NAPB
26.	Olaf//Era/Sugamuxi 68/3/Chris/ ND487//Lark	2375**	1988	PION
27.	SWGL/4/TZPP/Sonora64//Crim/3/ Red River	2370**	1989	PION
28.	BH1146/Veery	DA984-034	1989	WPB
29.	NDM00004/NK000751 S82-62	WA7493**	1988	WA
30.	NDM00004/NK000751 S82-62	WA7494**	1988	WA
31.	(RL4563) BW63*2/Columbus	BW114	1989	AGCAN

\*\* Semidwarf

## METHODS

Following are terminologies and testing methods used in the evaluation process:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000-Kernel Weight - The weight of 1000 kernels was determined by counting, using a Seedburo seed counter, the number of kernels in 10 g samples of cleaned, picked wheat.<sup>5/</sup>

Kernel Size - The percentages of the size of kernels (large, medium and small) were determined using a wheat sizer as described by Shuey<sup>6/</sup>.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm opening  
Middle Sieve - Tyler #9 with 2.24 mm opening  
Bottom Sieve - Tyler #12 with 1.65 mm opening

Potential Milling Yield - Potential yields are not shown on the tables, however, they may be determined by multiplying the percentages of the overs from each sieve (#7, #9 and #12) by the values of 78%, 73% and 68%, respectively. The cumulative percentages would represent potential yields.

Milling - The samples were cleaned by passing the wheat over an Emerson kicker and dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12.5% moisture for at least 72 hours, then tempered to 15.5% moisture and allowed to stand overnight prior to milling.

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5/ Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

6/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).



The Special Uniform Nursery Spring Wheat samples were milled on a Brabender Quadrumat Junior mill. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for one minute. The throughs of the #60 wire were classified as flour and represented the material tested. The overs of the #18 wire were classified as bran, and the overs of the #60 Tyler sieve were classified as crude shorts.

The Uniform Regional Nursery blends and the Field Plot Nursery samples were milled on a Buhler continuous experimental mill. The Buhler mill had been slightly modified for better comparison with commercial milling operations. Break scalping sieves were clothed with #54 stainless steel wire. Reduction scalping sieves were clothed with #58, #66 and #105 stainless steel wire for the first, second and third reductions, respectively. All flour sieves were clothed with #135 stainless steel wire.

The six flour streams obtained from Buhler milled wheat were combined and represented patent flour. The extraction of a good milling wheat using this flow is approximately 68% and is comparable to a commercial "long patent" extraction flour. At a 68% flour extraction, changes in flour ash are most sensitive to changes in percent extraction.

Hardness Test - Wheat hardness scores are reported on the samples. The procedure involves grinding the wheat samples with a Udy grinder and obtaining reflectance data from a Technicon 400 near infrared analyzer. Wavelengths used were 1680 nm and 2230 nm. This procedure was developed by Mr. Karl Norris, USDA, Beltsville through a co-operative research project in which the Hard Red Spring and Durum Wheat Quality Laboratory also participated. This procedure is not official and may be replaced with another in the future. Hard red spring wheats generally have scores between 60 and 85.

Protein Content - Both the Kjeldahl procedure and the near infrared techniques were used to determine protein content. Nitrogen values, as determined by the Kjeldahl procedure, were multiplied by 5.7 to calculate protein values.

Mineral or Ash Content - This was determined by measuring the residual weight of minerals remaining after incinerating the sample for approximately 16 hours at 575<sup>0</sup>C. The results were reported as percentages of the sample weights.

Mixograph Analysis - Mixograms for each flour sample were determined by using 30 g of flour and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the peak heights of the mixograms. Correction factors were determined from a series of flours by varying the amount of absorption.

Mixogram Patterns - Reference mixogram patterns shown on page 33 illustrate the different types of mixograms that were obtained. A single number is assigned each pattern to characterize and simplify the classification of the curves. The larger numbers indicate stronger curve characteristics.

Baking Procedure and Formula - Following is the baking formula used:

100% flour	3% Non-fat Dry Milk
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

Samples were mixed to optimum dough development in National Manufacturing mixers, the micro mixer for 25 g samples and the 100 g special mixer for 100 g samples. Bromate (7.5 ppm) for oxidation and barley malt flour (0.096%) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder.

Absorption - The amount of water, expressed as percent of flour, required for optimum dough consistency.

Crumb Color - A value was determined by comparing the crumb color of the tested sample with the crumb color of a baking standard. The standard flour was an equal blend of the variety Len grown at Casselton and Minot, ND, Redfield, SD, and Crookston, MN.

Loaf Volume - The volume of the baked loaf as determined by seed displacement.

All values (protein, ash and absorption) were reported on a 14% moisture basis.



## DISCUSSION

The following discussion presents the basic techniques and criteria used in the quality evaluation of the Hard Red Spring Wheat cultivars. Evaluations are based on the categories of kernel characteristics, milling performance, and baking score.

Each evaluation category is important. For example, a sample could be of a sufficiently poor quality for a given category to suggest elimination from future testing. However, a sample submitted for the first time and found to be questionable should be tested again to confirm previous evaluations. A sample which is consistently rated as questionable should be discarded.

Five kernel characteristics (test weight, 1000 kernel weight, percent small kernels, wheat ash and wheat protein) were independent variables used to calculate the dependent variable, wheat score. Four milling characteristics (percent extraction, ash content @ 65% extraction, flour protein, and milling character) were used to calculate the dependent variable, mill score. Seven characteristics (mixogram pattern, bake absorption, mixing time, dough characteristics, crumb color, crumb grain and loaf volume) were used to calculate the dependent variable, bake score. These three dependent variables become independent variables used to calculate a dependent variable, the general evaluation, which is an overall general score.

The current computer program used by the Wheat Quality Laboratory was designed and implemented to perform the analysis and tabulation of data generated from each station. The program has been in operation for eight years and utilizes the Statistical Analysis Systems (SAS Institute, Inc., SAS Circle, Box 8000, Cary, NC 27511).<sup>7/</sup>

Wheat samples are tested and data collected on 18 quality factors or variables. The computer program then grades each factor against predetermined faulting values and assigns major (MJ) or minor (MI) faults where applicable. The data is then broken down into 3 major areas which relate more directly to agronomic, industrial and consumer requirements. Each sample is assigned a score of 4 in the areas of Wheat Characteristics, Milling Characteristics and Baking Characteristics. The program then adjusts the score (4 = Good promise, 3 = Some promise, 2 = Little promise, 1 = No promise) depending upon the number of major and/or minor faults assigned to that sample.

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<sup>7/</sup> Nolte, L.L., Youngs, V.L., Crawford, R.D., and Kuerth, W. H. 1985. Computer program evaluation of hard red spring wheat. Cereal Foods World 30:227-229.

A general score is a numerical score of 1-4 and is determined by calculating the mean of the other 3 scores, wheat characteristics, milling characteristics, and baking characteristics.

The following tables list the variables used in each scoring area and their specific faulting and scoring values.

#### WHEAT SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Test Weight (#/bu)	57.9	56.9	-	-1
1000 Kernel Weight <sup>a/</sup> (g)	Mean-2.1	Mean-5.1	-	-1
Small Kernels (%)	8	16	-	-1
Wheat Ash (%)	1.71	1.81	-	-
Wheat Protein (%)	13.9	12.9	-1	-2

#### MILL SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Flour Extraction <sup>a/</sup> (%)	Mean-2.1	Mean-4.1	-1	-2
Flr. Ash @ 65% Ex. <sup>b/</sup> (g)				
Large Samples	.47	.51	-	-1
Small Samples	.57	.61	-	-1
Flour Protein (%)	12.9	12.4	-1	-1
Milling Character <sup>c/</sup>	3	2	-1	-2

<sup>a/</sup> The mean, or average, is calculated using the standards tested with that station.

<sup>b/</sup> Large samples are milled on a Buhler experimental mill, and small samples are milled on a Quadrumat Jr. experimental mill. Different values are used to compensate for differences in the efficiency of the two mills and their respective procedures.

<sup>c/</sup> 5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft.  
1 = Gritty. 0 = Very soft.



# BAKE SCORE

<u>Variables Included</u>	<u>Faulting Limits</u>		<u>Effect on Score</u>	
	<u>Minor</u>	<u>Major</u>	<u>Minor</u>	<u>Major</u>
Mixogram Pattern <sup>a/</sup>	2,7 or 8	1, or 9-11	-	-1
Bake Absorption (%)	61.9	60.4	-1	-2
Mix Time (min.)	5.75-8.00	0-1.75	-1	-2
	or 2.00-2.75	or over 8.00	-1	-2
Dough Characteristic <sup>b/</sup>	6,5	4 or less	-	-2
Crumb Color <sup>c/</sup>	6-4	3 or less	-	-1
Crumb Grain <sup>d/</sup>	7-4	3 or less	-	-1
Loaf Volume <sup>e/</sup> (cc)	Lg. Mean-55	Mean-105	-1	-2
	Sm. Mean-21	Mean-3	-1	-2

a/ Refer to reference mixograms for numerical curve pattern.  
(1 = very weak, 11 = very strong)

b/ 9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable.  
6 = Pliable. 5 = Very pliable. 4 = Very elastic.  
3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable.  
0 = Dead.

c/ The column headed Crumb Color has two scores. The first score is the brightness, or sheen, of the grain as compared to the standard(s). (Standard = 100.) The second score is a single digit indicating the color of the interior of the loaf. 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.

d/ The column headed Crumb Grain has two scores. The first score is a numerical comparison against the standard(s). The second score indicates the structure of the grain. 13 = Normal. 12 = Slightly irregular. 11 = Slightly open. 10 = Slightly irregular and slightly open. 9 = Slightly open and slightly irregular. 8 = Irregular. 7 = Open. 6 = Irregular and slightly open. 5 = Open and slightly irregular. 4 = Irregular and open. 3 = Open and irregular. 2 = Coarse. 1 = Harsh. 0 = Soggy.

e/ Average values are calculated using the standards tested with that station. "Lg." refers to the faulting and scoring values for 100 g. loaves. "Sm." refers to the faulting and scoring values for 25 g. (pup) loaves.

All samples are compared with a milling and baking standard representative of the crop year and blended to a known quality. However, the samples from the individual stations are evaluated against the average results of the check varieties from the respective stations. Agronomic and climatic conditions of the individual locations can affect the quality of the wheat such that the evaluation of all samples, including named cultivars, harvested from these locations may be classified as questionable to unsatisfactory. Therefore, the evaluation ratings from one station may not be compared with ratings from other stations, but only provide a comparison within that station. For example, an area may produce low protein wheat with large and plump kernels, good milling performance, and good kernel characteristics, but with low flour protein and unsatisfactory baking performance such as short mixing time, low loaf volume, and weak dough characteristics. The wheat from this area could not be considered a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. An acceptable variety should have tolerance to a wide range of environmental conditions.

Kernel Characteristics are important in determining the initial value of wheat. Poor kernel characteristics could disqualify a new variety from further consideration. Because of the present grading system, high test weight is desirable. Plump kernels are desirable because of their high ratio of endosperm to bran. Low 1000-kernel weight and small kernel size distribution affect milling performance due to their high ratio of bran to endosperm. Wheat ash is an important factor when comparing one cultivar against other standard cultivars. Wheat with a high mineral content may yield flour with a high ash content. Wheat protein must be considered as an important characteristic when comparing cultivars grown at the same location. Wheats with lower protein values than the standard cultivars are undesirable since protein affects baking performance.

Milling Performance is a very important characteristic of spring wheats. Low extraction and high flour ash are major factors unacceptable under commercial milling operations. Flour mineral contents are reported at a constant extraction of 65% so that flour extraction rates among cultivars are easily compared. As a general rule, an increase of 0.01% in ash content is equivalent to an increase of approximately 2% in flour extraction.



Milling characteristics: Wheat comprising soft kernels requires different milling techniques when compared with wheat of uniform hard kernels. On commercial mills flowed for hard vitreous spring wheats, the introduction of soft wheats into the mill will result in milling problems. Likewise, a sample which is extremely hard and vitreous will mill differently. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface, and temper to be milled properly. The blending of normal bread wheats with soft wheats or extremely hard, vitreous wheats is undesirable since they are not compatible in the milling operation. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. Adjustments would either have to be made in the milling flow or in tempering procedures to compensate for differences in kernel hardness. Properties of soft wheat may or may not be compatible with other wheats. Therefore, maintaining pure varieties with uniform milling characteristics is important.

The amount of protein recovered in flour from wheat is important. High protein wheats yielding low protein flours are not desirable. Such wheats would contain much of the protein distributed in the outer portion of the kernels resulting in excessive protein in the feed streams. Therefore, higher wheat protein would be necessary to yield a flour with protein content comparable to that of a wheat that yields optimum flour protein.

Mixogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. From the standard mixogram patterns shown on page 33, patterns 6 - 8 indicate flours with optimum mixing tolerance and gluten strength. Mixogram patterns 9 - 11 indicate flour samples with long mixing times, and strong gluten characteristics, whereas, patterns 1 - 5 indicate flours with weak gluten characteristics and short mixing times. Both the pattern and length of the curve are important, and both must be considered in the evaluation. Abnormal curves, such as sway-back or long initial times to incorporate water, indicate undesirable characteristics.

Baking Evaluation takes into account the flour water absorption, mixing time, dough characteristics, loaf volume, crumb texture, and machinability. Flour samples with low water absorptions would be unsatisfactory. Samples with extremely short mixing times would also be considered undesirable as strong spring wheats. Samples evaluated in the minimal range for these values require further testing to determine whether definite deficiencies exist.

Doughs having mellow to weak properties show a tendency towards weakness. Doughs having mellow to strong properties show a tendency to be strong, whereas, doughs having strong to mellow properties show a tendency to be mellow. Since these characteristics are evaluated by subjective means, the tendencies are estimated which allows for double grades.

The crumb grain or appearance of the interior of the loaf shows how well the sample stood up during baking and may indicate some deficiencies which have been observed during the baking test. Crumb grain is likely related to gluten protein performance (quantity and quality).

Bread loaf volume indicates potential strength of doughs in a different manner than mixing time or dough characteristics. Optimum loaf volume demonstrates the capacity or lack thereof for the dough to expand under pressure and to contain the entrapped gases during expansion. Weak doughs are like balloons which burst when blown up. They tend to collapse and yield breads with low loaf volumes, or yield breads with extremely large volumes containing large holes in the interior. Low protein flours produce extensible doughs which exhibit properties similar to putty. These doughs do not expand adequately during fermentation or baking and thus produce bread with low loaf volumes. Tough and very bucky doughs are bound too tightly and impede expansion of the gases resulting in breads with low loaf volume. Loaf volume is a characteristic probably related to gluten functionality in the dough.

General Evaluation rating applies only to the data contained in the year of the report. However, a summation of total and major deficiencies, and an average General Evaluation score for the number of years the sample has been tested are provided in the discussion of individual varieties and selections of the Uniform Regional Nursery.



## UNIFORM REGIONAL NURSERY SAMPLES - 1989 CROP

### Discussion of area Blends

A total of 675 Uniform Regional Nursery samples were received from 21 stations in 8 states. However, only 650 wheat samples were blended for this crop year by area. The areas tend to represent movement of wheat in the market (See map, page 7). Kernel characteristics were determined on individual samples to eliminate possible sampling errors. The area blends were then milled and baked by the macro method. Thirty-one samples were received from each of the 21 stations. Twenty-six selections were included for quality evaluation in the Uniform Regional Nursery samples. The remainder of the samples were the commercially named varieties Butte 86, Chris, Era, Marquis, and Stoa.

Data from the southeastern area blend are shown in Table 5. The six stations included in this blend were Brookings, Redfield and Selby, South Dakota, Morris and St. Paul, Minnesota, and Madison, Wisconsin. Madison, Wisconsin submitted ten extra samples. These samples were processed individually and the data are reported in Table 8.

Data from the northeastern area blend are shown in Table 4. The five stations included in this blend were Fargo, Langdon, Minot and Carrington, North Dakota, and Crookston, Minnesota.

Data from the midwestern area blend are shown in Table 6. The five stations included in this blend were Williston and Dickinson, North Dakota, Sheridan and Powell, Wyoming, and Sidney, Montana. Williston, North Dakota submitted two extra samples. These samples were processed individually, and the data are reported in Table 7.

Data from the western area blend are shown in Table 3. The five stations included in this blend were Havre and Bozeman, Montana, Aberdeen and Tetonia, Idaho, and Pullman, Washington. Tetonia and Aberdeen, Idaho each submitted four extra samples and Pullman, Washington submitted five extra samples. These samples were processed individually, and the data are reported in Tables 9, 10, and 11.

### Discussion of Area and Crop Year Averages

Tables 1 and 2 show the average area results of combined data for the varieties Butte 86, Chris, Era, and Stoa. Area averages represent all samples that were grown in that area for the year cited. Milling and baking results were obtained from the area blend of wheats in equal proportions from each of the stations for the respective variety or selection.

Comparisons are shown for the previous five crop years and include all selections grown in the Uniform Regional Nursery for that year as well as the 5 YA. Kernel characteristics (test weight, 1000 kernel weight, and kernel size) for 1989 crop were lower than the 5 YA. Wheat ash was .07% higher than the 5 YA. Wheat protein was 1.1% higher, and flour protein was .9% higher. Flour extraction was 1.1% lower than the 5 YA. Bake absorption was 4.8% lower than the 5 YA. The value for the dough characteristics was equal to last year. Crumb grain and loaf volume were higher than the 5 YA.

The general score shows the 1989 to be .3% lower than 1988. Test weight was lower for the 1989 crop. One-thousand KWT was slightly higher for the 1989 crop. Wheat ash and flour ash were slightly higher for the 1989 crop. Wheat protein and flour protein were lower than the 1988 crop year. Bake absorption was 5.3% lower while the mix time was equal to the 1988 crop. Loaf volume was higher compared to the 1988 crop.

#### Discussion of Individual Varieties or Selections

Each selection or variety will be discussed from a general viewpoint rather than emphasis on a specific growing area.

Average results of the varieties Butte 86, Era, and Stoa for each of the individual areas were used as standards for the other selections from that area. Therefore, a variety or selection may be rated satisfactory in two different areas, but comparison of the data may show much poorer results for one area due to adverse environmental conditions. The sample with poor results could be rated as having unsatisfactory quality when compared with the overall spring wheat area, even though it may be rated as showing good promise for one particular area.



Following the same format used in previous years and employing the computer program, all named varieties received a general evaluation. The word descriptions of these numerical scores are as follows: 1-1.4, no promise; 1.5-2.4, little promise; 2.5-3.4, some promise; 3.5-4.0, good promise. Only those varieties in the "Good Promise" category could be consistently considered as acceptable to the trade both in the domestic, as well as foreign markets. Data for the named varieties of Butte 86, Chris, Era, Marquis, and Stoa are an average of each variety for the last three years.

<u>Butte 86</u>	(3.5 - 12/5) <sup>8/</sup>	- Good Promise
<u>Chris</u>	(3.6 - 19/3)	- Good Promise
<u>Era</u>	(3.4 - 15/5)	- Some Promise
<u>Marquis</u>	(3.3 - 15/6)	- Some Promise
<u>Stoa</u>	(3.8 - 10/3)	- Good Promise

BW 114 (3.0 - 14/4) (1 yr.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Some promise.

DA 984-034 (3.5 - 7/2) (1 yr.)

Faults:

Kernel Characteristics - Test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, crumb grain.

General Evaluation - Good promise.

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<sup>8/</sup> (Average General Evaluation - # Total Deficiencies/Major Deficiencies)

HS 85-476 (3.7 - 18/7) (2 yrs.)

Faults:

Kernel Characteristics - Test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, crumb grain.

General Evaluation - Good promise.

HS 85-674 (3.5 - 21/10) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, bake absorption, dough characteristics, crumb color, crumb grain.

General Evaluation - Good promise.

HS 85-902 (3.4 - 25/9) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.



MN 85324 (3.3 - 23/10) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, bake absorption, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

MN 86018 (3.0 - 17/4) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Extraction.

Baking Evaluation - Bake absorption, mix time, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

MN 86151 (3.3 - 12/4) (1 yr.)

Faults:

Kernel Characteristics - Test weight, small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, dough characteristics, crumb color, crumb grain.

General Evaluation - Some promise.

MN 86329 (3.2 - 12/4) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Extractiion, Flour ash @ 65%.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Some promise.

MN 86383 (3.1 - 11/7) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, dough characteristics, crumb grain.

General Evaluation - Some promise.

N 86-370 (3.2 - 16/7) (1 yr.)

Faults:

Kernel Characteristics - 1000 KWT, small kernels.

Milling Performance - Extraction.

Baking Evaluation - Mix pattern, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.



N 86-903 (3.2 - 16/7) (1 yr.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

ND 650 (3.4 - 17/6) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Some promise.

ND 652 (3.7 - 17/3) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, mix time, crumb color, crumb grain.

General Evaluation - Good promise.

ND 653 (3.4 - 10/7) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, bake absorption, mix time, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

ND 655 (3.7 - 8/2) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Good promise.

ND 658 (3.5 - 7/5) (1 yr)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, mix time, crumb color, crumb grain.

General Evaluation - Good promise.



PR 2370 (3.2 - 16/6) (1 yr.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Flour ash @ 65%.

Baking Evaluation - Mix pattern, bake absorption, mix time, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

PR 2375 (3.6 - 15/5) (2 yrs.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Flour ash @ 65%.

Baking Evaluation - Bake absorption, mix time, crumb grain.

General Evaluation - Good promise.

SD 3005 (3.6 - 29/7) (3 yrs.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Good promise.

SD 3014 (3.2 - 24/11) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels.

Milling Performance - Extraction.

Baking Evaluation - Mix pattern, bake absorption, dough characteristics, crumb color, crumb grain.

General Evaluation - Some promise.

SD 3026 (3.6 - 9/2) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

SD 3032 (3.7 - 9/1) (1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.



SD 3036 (2.8 - 17/7) ( 1 yr.)

Faults:

Kernel Characteristics - Satisfactory.

Milling Performance - Satisfactory.

Baking Evaluation - Bake absorption, mix time, dough characteristics, crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

WA 7493 (3.6 - 23/5) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, bake absorption, crumb grain.

General Evaluation - Good promise.

WA 7494 (3.7 - 21/5) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, small kernels.

Milling Performance - Satisfactory.

Baking Evaluation - Mix pattern, bake absorption, crumb grain.

General Evaluation - Good promise.

1989 UNIFORM REGIONAL HARD RED SPRING WHEAT  
NURSERY SAMPLES NOT INCLUDED  
IN THE AREA BLENDS

Williston, North Dakota

Two varieties Amidon and Len were received from this station. Our 1989 standard was used as the standard. The data for these samples are shown in Table 7.

Madison, Wisconsin

Ten varieties were received from this station. Our 1989 standard was used as the standard. The data for these samples are shown in Table 8.

Tetonia, Idaho

Two varieties Copper and Pondera and two selections IDO-312, and IDO-341 were received from this station. Our 1989 standard was used as the standard. The data for these samples are shown in Table 9.

Aberdeen, Idaho

Two varieties, Copper and Pondera and two selections IDO-312, and IDO-341 were received from this station. Our 1989 standard was used as the standard. The data for these samples are shown in Table 10.

Pullman, Washington

Three varieties Copper, Edwall and Spillman and two selections SD 2961 and WPB 906 were received from this station. Our 1989 standard was used as the standard. The data for those samples are shown in Table 11.

FIELD PLOT NURSERY SAMPLES - 1989 CROP

Fifty-seven samples were received from two states at four stations. The data for the individual samples are shown in Tables 12-15.

Minot, Langdon and Fargo - North Dakota

Six named varieties were received from Minot. Three named varieties were received from Langdon and four named varieties were received from Fargo. Our 1989 standard, Len was used as the standard. The average general score for Minot is 3.1, for Langdon 3.1, and for Fargo 3.5. The data for these three stations are shown in Tables 12-14.

Imperial Valley - California

Ten varieties and thirty-four selections were received from this station using Yecoro Rojo as the standard. The data for this station are shown in Table 15.



EXPLANATION OF ABBREVIATIONS LISTED UNDER THE  
HEADINGS AND THOSE THAT MAY BE LISTED UNDER  
MINOR AND MAJOR DEFICIENCIES ON COMPUTER PRINTOUT

TW = Test Weight  
KW = 1,000 Kernel Weight  
LG = Large Kernels  
SM = Small Kernels

WHT ASH = Wheat Ash  
WP; WHT PRO = Wheat Protein  
EX = Flour Extraction  
A65 = Ash at 65% Flour Extraction

FP; FLR PRO = Flour Protein  
MC; MILL CHAR = Milling Characteristics  
MIX ABS = Mixograph Absorption

MX: MIX PAT = Mixograph Pattern Score  
BA; BAKE ABS = Actual Bake Absorption  
MT: MIX TIME = Actual Dough Mixing Requirements

DC; DOUGH CHAR = Dough Handling Characteristics  
CC; CRUMB COLOR = Example - 100 4  
100 = Score received for brightness of the  
crumb grain  
4 = Creamy-the color characteristic of  
that particular loaf (only the second  
score is faulted)

CG; CRUMB GRAIN = Example - 90 7  
90 = Score received for crumb grain  
7 = Open-or characteristic of that  
loaf's crumb grain (only the second  
score is faulted)

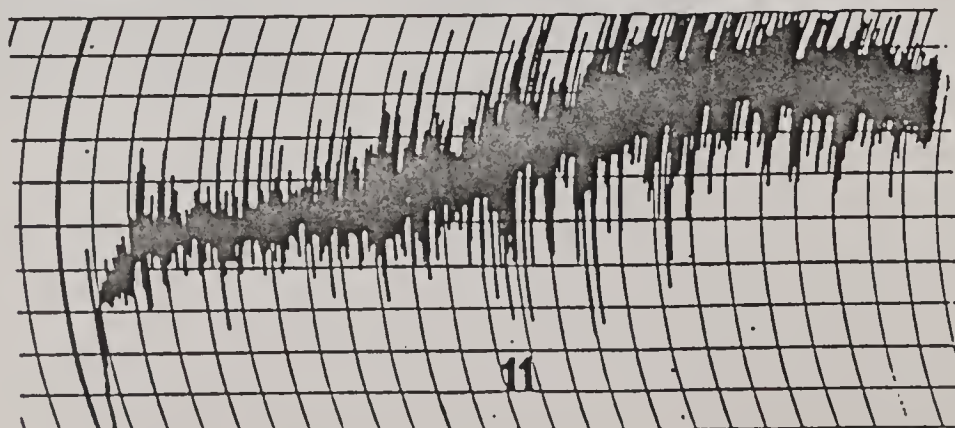
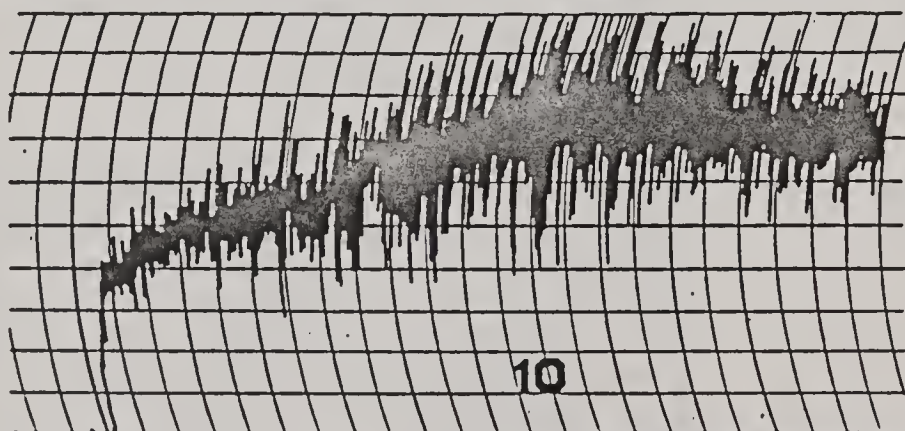
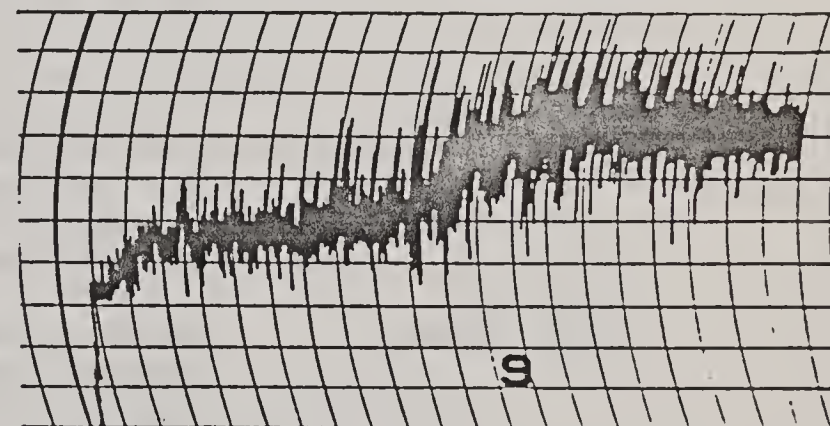
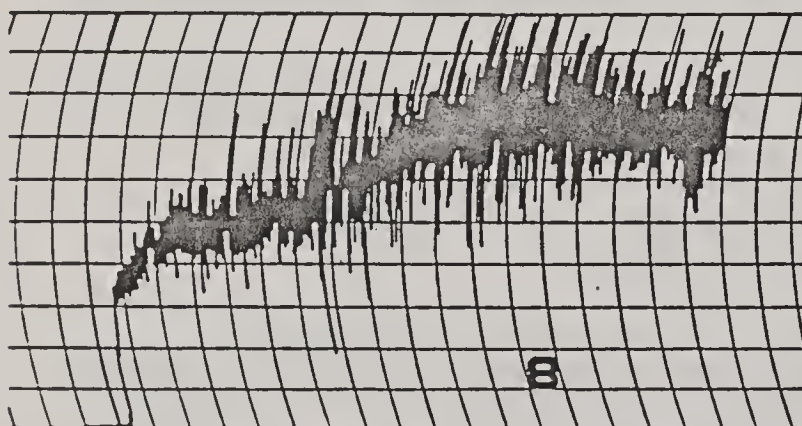
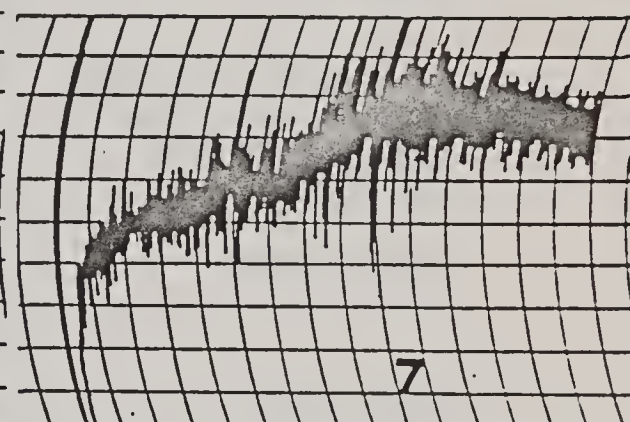
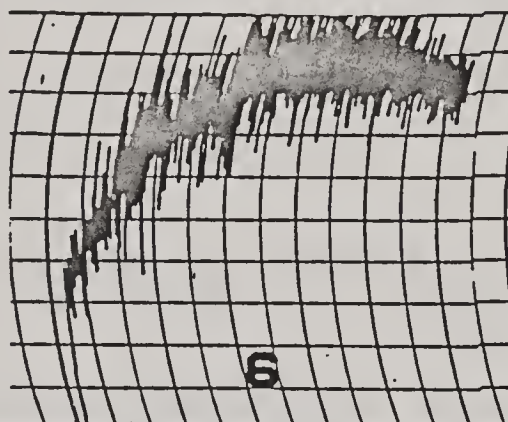
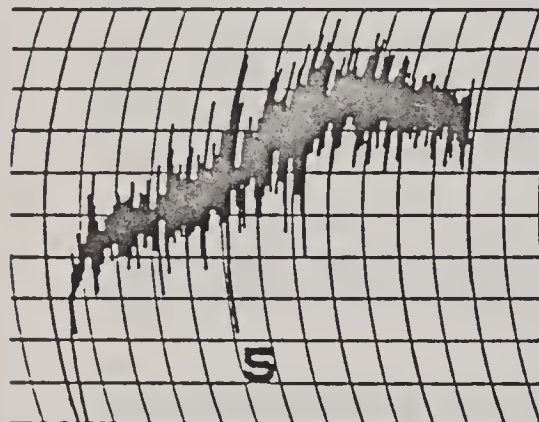
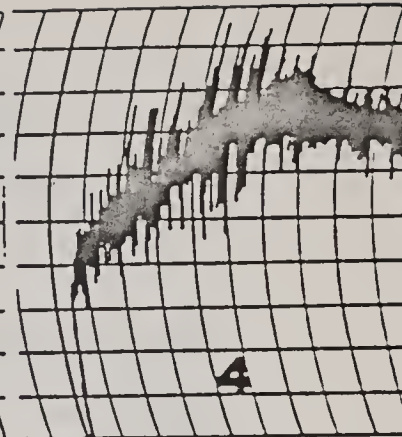
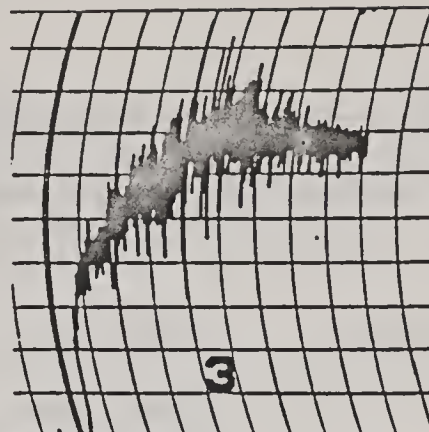
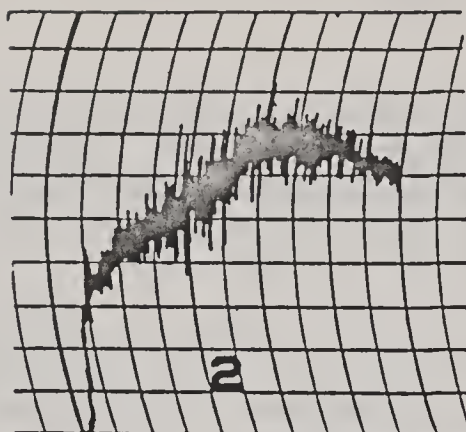
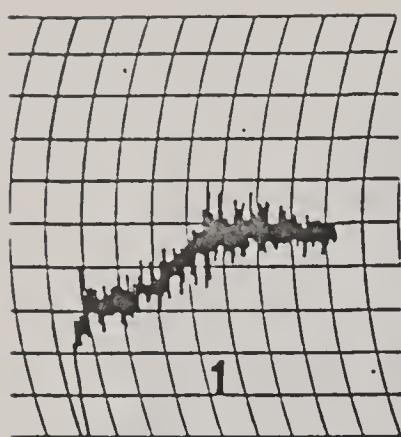
LV; LOAF VOL = Loaf Volume

# FOOTNOTES FOR TABLES

These footnotes are applicable for specified column headings in all tables that follow

<u>Column Heading</u>	<u>Footnote</u>
TEST WT	Clean dry - Subtract 1 lb/bu for dockage-free TW.
WHT ASH, WHT PRO, ASH @ 65%, FLR PRO, BAKE ABS (100 G loaf)	14% Moisture basis.
MILL CHAR	5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.
MIX PAT	Refer to reference mixograms for numerical curve pattern. (1 = Very weak - - - 11 = Very strong.)
DOUGH CHAR	9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable. 6 = Pliable. 5 = Very pliable. 4 = Very elastic. 3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable. 0 = Dead.
CRUMB COLOR	First column: A realistic score of brightness compared with a 1989 ND standard scored as 100. Second column: 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.
CRUMB GRAIN	First column: A relative overall crumb grain score as compared with a 1989 ND standard scored as 90. Second column: 13 = Normal. 12 = Slightly irregular. 11 = Slightly open. 10 = Slightly irregular and slightly open. 9 = Slightly open and slightly irregular. 8 = Irregular. 7 = Open. 6 = Irregular and slightly open. 5 = Open and slightly irregular. 4 = Irregular and open. 3 = Open and irregular. 2 = Close. 1 = Harsh. 0 = Soggy.

STANDARD MIXOGRAM PATTERNS





QUALITY DATA OF UNIFORM REGIONAL BLENDS

AREA AND CROP-YEAR AVERAGES

TABLE 1

VARIETY	STD	WT #/BU	TEST 1000	SIZING	WHT	WHT	HARD-	WHEAT	FLR	ASH	@	FLR	MILL	MILL	SCORE	ABS	MIX	MIX.
			K.WT	LG	SM	ASH	PRO	NESS	SCORE	EXT	%	65%	EX	PRO	CHAR	SCORE	***	PAT
			G.	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
***WESTERN AREA ***																		
BUTTE 86	S	59.5	29.6	17	3	1.60	15.5	82	4	69.5	0.25	14.3	5	4	61.3	4		
CHRIS	S	59.1	26.0	12	5	1.47	16.2	79	4	69.8	0.31	15.5	5	4	60.4	3		
ERA		59.2	28.1	28	8	1.46	15.0	78	4	70.7	0.33	14.0	5	4	58.1	3		
STOA	S	59.4	26.1	18	4	1.54	15.9	79	4	69.7	0.35	14.9	5	4	62.2	4		
AREA AVERAGE		59.5	30.2	25	3	1.53	15.4	75	4	70.3	0.31	14.5	5	4	61.9	4		
***NORTHEASTERN AREA ***																		
BUTTE 86	S	60.9	29.7	21	3	1.51	16.3	81	4	69.5	0.39	14.9	5	4	63.9	5		
CHRIS	S	60.6	24.0	6	5	1.58	16.8	86	4	67.9	0.30	15.5	5	4	61.0	4		
ERA		60.5	25.4	9	8	1.64	15.1	81	4	71.1	0.33	13.9	5	4	60.1	5		
STOA	S	59.9	26.2	6	8	1.58	16.4	82	4	69.2	0.34	15.5	5	4	63.1	6		
AREA AVERAGE		60.5	28.5	18	6	1.57	16.2	80	4	68.7	0.33	15.1	5	4	62.7	5		
***SOUTHEASTERN AREA ***																		
BUTTE 86	S	59.9	31.6	30	2	1.68	16.0	83	4	67.6	0.38	14.5	5	4	62.8	4		
CHRIS	S	58.7	24.9	9	3	1.95	16.7	81	4	68.0	0.35	15.4	5	4	60.4	3		
ERA		59.1	26.5	13	5	1.91	15.5	78	4	69.3	0.39	13.5	5	4	58.7	4		
STOA	S	59.3	27.6	13	4	1.68	15.7	75	4	68.2	0.35	14.5	5	4	61.0	5		
AREA AVERAGE		59.2	29.8	23	3	1.75	15.8	75	4	68.3	0.38	14.6	5	4	61.4	5		
***MIDWESTERN AREA ***																		
BUTTE 86	S	60.4	25.8	18	6	1.64	16.5	92	4	69.2	0.37	15.2	5	4	64.8	5		
CHRIS	S	59.0	21.0	9	11	1.59	17.1	76	4	67.3	0.37	15.6	5	4	63.1	3		
ERA		60.3	24.8	7	10	1.69	15.6	88	4	69.4	0.39	14.7	5	4	65.4	6		
STOA	S	59.4	24.3	6	13	1.68	16.2	88	4	68.4	0.36	15.2	5	4	63.6	7		
AREA AVERAGE		60.0	27.2	15	8	1.65	16.4	84	4	68.3	0.37	15.5	5	4	64.5	6		



## AREA AND CROP-YEAR AVERAGES

TABLE 2

VARIETY	STD	WT #/BU	TEST 1000	LG	<u>SIZING</u>	WHT	WHT	WHT	HARD-	WHEAT	FLR	ASH	ASH @	FLR	CHAR	MILL	MIX	MIX.
		K.WT G.		%	SM	ASH	PRO	NESS	SCORE	***	EXT	%	65%	EX	PRO	SCORE	ABS	PAT
				%	%	%	%		***	%	%	%	%	%	%	***	%	%
***CROP-YEAR AVERAGES ***																		
1984 AVERAGE	60.0	31.5	30	5	1.66	13.7	.	3	69.9	0.39	13.0	5	4	62.7	5			
1985 AVERAGE	60.8	32.4	33	3	1.62	14.0	.	4	70.6	0.36	13.0	5	4	64.3	4			
1986 AVERAGE	59.0	29.8	23	5	1.77	14.4	67	4	69.3	0.37	13.4	5	4	65.8	5			
1987 AVERAGE	60.8	32.6	37	3	1.62	14.9	70	4	69.0	0.35	14.0	5	4	67.3	6			
1988 AVERAGE	60.2	29.4	23	5	1.73	16.3	81	4	68.4	0.38	15.3	4	4	68.4	6			
1989 AVERAGE	59.2	29.8	23	3	1.75	15.8	75	4	68.3	0.39	14.6	5	4	61.4	5			
1984-88 AVERAGE	60.2	31.1	29	4	1.68	14.7	73	4	69.4	0.37	13.7	5	4	65.7	5			

# QUALITY DATA OF UNIFORM REGIONAL BLENDS

### AREA AND CROP-YEAR AVERAGES

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----														
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
***CROP-YEAR AVERAGES ***																								
1984 AVERAGE		63.5	4.25	8	101 6	88 7	872	4	3.7				MI									MI	MI	
1985 AVERAGE		64.4	4.00	8	101 7	88 6	875	4	4.0														MI	MI
1986 AVERAGE		66.7	4.00	9	101 7	88 7	934	4	4.0														MI	MI
1987 AVERAGE		68.3	4.25	8	101 7	87 5	898	4	4.0														MI	MI
1988 AVERAGE		66.3	3.50	8	101 7	88 6	848	4	4.0														MI	MI
1989 AVERAGE		61.0	3.50	8	100 7	88 7	981	3	3.7										MI				MI	MI
1984-88 AVERAGE	S	65.8	4.00	8	101 7	88 6	885	4	4.0														MI	MI



QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE= STATION=WESTERN AREA NURSERY=BLEND

TABLE 3

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	LG %	SIZING SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE 86	S	59.5	29.6	17	3	1.60	15.5	82	4	69.5	0.25	14.3	5	4	61.3	4
CHRIS	S	59.1	26.0	12	5	1.47	16.2	79	4	69.8	0.31	15.5	5	4	60.4	3
ERA		59.2	28.1	28	8	1.46	15.0	78	4	70.7	0.33	14.0	5	4	58.1	3
MARQUIS		60.3	29.6	26	3	1.59	16.1	78	4	69.0	0.29	14.9	5	4	60.4	3
STOA	S	59.4	26.1	18	4	1.54	15.9	79	4	69.7	0.35	14.9	5	4	62.2	4
BW 114		59.7	29.2	16	4	1.53	16.2	87	4	70.2	0.32	15.4	5	4	61.6	3
DA 984-034		58.9	30.4	20	5	1.53	15.3	75	4	69.7	0.30	14.7	5	4	63.6	4
HS 85-476		58.9	32.1	36	2	1.56	15.2	65	4	72.9	0.34	15.0	5	4	63.3	4
HS 85-674		59.1	32.7	24	4	1.53	14.3	62	4	71.4	0.32	13.9	5	4	61.0	5
HS 85-902		59.2	29.9	29	2	1.52	15.2	78	4	69.9	0.31	14.1	5	4	60.1	4
MN 85324		60.0	32.8	34	2	1.50	14.7	75	4	70.8	0.31	13.7	5	4	60.7	5
MN 86018		60.3	29.6	21	4	1.51	15.0	80	4	68.5	0.35	13.7	5	4	61.0	3
MN 86151		57.3	31.6	29	3	1.62	15.3	67	4	70.7	0.35	14.3	5	4	61.9	4
MN 86329		59.4	34.3	44	1	1.74	15.2	74	4	72.0	0.37	14.0	5	4	63.1	3
MN 86383		60.2	31.1	31	2	1.53	15.0	66	4	71.2	0.23	14.5	5	4	60.4	4
N 86-370		60.0	27.1	19	5	1.54	15.5	75	4	69.5	0.35	14.9	5	4	63.9	6
N 86-903		60.9	29.8	20	2	1.46	14.9	81	4	69.7	0.32	13.7	5	4	62.8	5
ND 650		60.4	30.4	32	2	1.57	16.1	88	4	68.9	0.35	15.0	5	4	63.6	4
ND 652		60.2	30.9	31	2	1.55	16.0	86	4	69.7	0.32	15.0	5	4	63.6	5
ND 653		58.6	28.2	21	3	1.62	14.9	65	4	71.6	0.28	14.3	5	4	59.8	3
ND 655		61.2	30.3	25	2	1.53	15.7	81	4	71.8	0.27	15.0	5	4	62.2	4
ND 658		60.5	30.7	25	2	1.41	15.9	74	4	71.0	0.27	15.2	5	4	62.5	5
PR 2370		59.6	31.7	26	4	1.43	15.3	76	4	69.8	0.33	14.4	5	4	62.5	4
PR 2375		60.3	31.1	16	2	1.35	15.2	79	4	71.7	0.29	14.4	5	4	62.5	4
SD 3005		59.7	29.0	26	1	1.55	15.5	64	4	70.5	0.25	15.1	5	4	62.2	4
SD 3014		59.4	28.5	17	7	1.62	15.2	75	4	69.3	0.31	14.1	5	4	61.0	4
SD 3026		59.6	31.5	27	3	1.64	15.1	76	4	70.6	0.33	14.0	5	4	64.2	5
SD 3032		60.0	31.8	26	2	1.57	15.8	81	4	69.9	0.35	14.9	5	4	63.9	5
SD 3036		60.8	32.4	24	1	1.43	15.6	79	4	67.8	0.34	14.3	5	4	61.6	4
WA 7493		56.6	29.4	19	11	1.47	15.0	53	3	70.6	0.30	14.6	5	4	61.9	5
WA 7494		57.2	30.3	23	7	1.53	14.8	55	4	71.1	0.32	14.5	5	4	61.9	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 3 (Cont.)

STATE= STATION=WESTERN AREA NURSERY=BLEND

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----															
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV	
BUTTE 86	S	61.2	2.50	6	100	4	88	4	1055	1	3.0								MI	MI	MI	MJ			
CHRIS	S	60.3	2.25	7	100	4	89	8	1020	1	3.0								MJ	MI	MI	MI	MI		
ERA		57.8	2.50	7	101	4	87	3	1195	1	3.0								MJ	MI	MI	MJ			
MARQUIS		60.2	2.25	7	101	4	87	4	1115	1	3.0								MJ	MI	MI	MJ			
STOA	S	61.8	3.00	9	101	7	88	4	1150	2	3.3								MI				MJ		
BW 114		61.2	1.75	7	100	4	89	6	1040	1	3.0								MI	MJ			MI		
DA 984-034		63.2	2.25	9	101	7	88	3	1110	2	3.3									MI				MJ	
HS 85-476		62.7	3.00	9	100	4	88	4	1200	3	3.7												MI	MJ	
HS 85-674		60.4	3.25	9	100	6	89	3	1090	1	3.0												MI	MJ	
HS 85-902		59.7	3.25	8	100	3	88	3	1000	1	3.0								MJ				MJ	MJ	MI
MN 85324		60.1	3.00	9	101	7	88	4	1020	1	3.0								MJ				MJ	MJ	MI
MN 86018		60.5	2.50	6	101	6	87	3	1000	1	3.0								MJ				MJ	MJ	MI
MN 86151		61.3	2.50	9	101	8	88	6	1090	2	3.3								MI	MI	MI		MJ	MJ	MI
MN 86329		62.3	2.00	8	101	4	87	3	1250	2	3.3								MI				MI	MJ	
MN 86383		59.9	2.75	9	102	8	89	4	1090	1	3.0								MJ	MI			MJ	MJ	
N 86-370		63.1	3.25	9	101	3	88	3	1105	2	3.3												MJ	MJ	
N 86-903		62.2	2.50	9	100	4	88	3	1040	2	3.3												MI	MJ	
ND 650		63.0	2.00	7	101	7	89	4	1250	2	3.3												MI	MJ	
ND 652		63.6	2.75	9	101	8	87	3	1290	2	3.3												MI	MJ	
ND 653		59.2	2.50	9	101	7	89	4	1090	1	3.0												MI	MJ	
ND 655		61.8	2.50	9	101	4	89	3	1105	1	3.0												MI	MJ	
ND 658		62.1	2.75	9	101	8	88	3	1140	2	3.3												MI	MJ	
PR 2370		61.9	2.75	9	101	8	87	3	1120	1	3.0												MI	MJ	
PR 2375		61.9	2.50	9	101	8	89	6	1075	2	3.3												MI	MJ	
SD 3005		61.7	2.25	9	101	4	87	3	1245	1	3.0												MI	MJ	
SD 3014		60.4	3.50	8	102	4	89	7	1090	2	3.3												MI	MJ	
SD 3026		63.5	2.25	8	101	6	89	6	1040	3	3.7								MJ				MI	MI	
SD 3032		63.3	2.50	9	101	7	88	6	1120	3	3.7												MI	MI	
SD 3036		60.1	2.50	6	101	7	88	3	920	1	3.0												MI	MI	
WA 7493		61.2	3.00	9	102	8	88	4	1300	2	3.0												MI	MJ	
WA 7494		61.2	3.00	9	102	8	88	3	1170	2	3.3												MI	MJ	

DEFICIENCIES TW KW SM WP EX A65 FP MC MX BA MIX TIME (MT) DC CC CG LV  
 MINOR FAULTING VALUES 57.9 25.1 8 13.9 67.6 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 8 1E3  
 MAJOR FAULTING VALUES 56.9 22.1 18 12.9 65.6 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 970

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE= STATION=NORTHEASTERN AREA NURSERY=BLEND

TABLE 4

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE 86	S	60.9	29.7	21	3	1.51	16.3	81	4	69.5	0.39	14.9	5	4	63.9	5
CHRIS	S	60.6	24.0	6	5	1.58	16.8	86	4	67.9	0.30	15.5	5	4	61.0	4
ERA		60.5	25.4	9	8	1.64	15.1	81	4	71.1	0.33	13.9	5	4	60.1	5
MARQUIS		60.8	24.8	7	6	1.62	16.1	78	4	67.2	0.35	14.7	5	4	59.5	4
STOA	S	59.9	26.2	6	8	1.58	16.4	82	4	69.2	0.34	15.5	5	4	63.1	6
BW 114		60.6	27.0	20	6	1.67	16.7	84	4	69.4	0.32	15.6	5	4	61.0	4
DA 984-034		59.7	28.7	16	4	1.60	16.1	83	4	68.4	0.34	15.3	5	4	63.6	5
HS 85-476		59.0	29.0	25	4	1.55	16.2	66	4	71.7	0.33	15.6	5	4	63.3	6
HS 85-674		59.4	26.0	17	6	1.72	15.5	70	4	69.6	0.31	14.6	5	4	61.9	6
HS 85-902		60.6	29.8	39	8	1.51	15.6	79	4	70.0	0.33	14.5	5	4	60.4	6
MN 85324		60.2	30.5	25	5	1.47	15.9	79	4	68.4	0.33	14.7	5	4	63.1	7
MN 86018		61.2	28.1	12	5	1.60	16.0	86	4	65.9	0.36	14.4	5	3	61.9	4
MN 86151		59.5	30.3	20	6	1.55	15.7	79	4	70.2	0.33	14.7	5	4	63.6	6
MN 86329		59.8	33.5	45	2	1.87	16.9	85	4	66.3	0.37	15.2	5	3	63.9	4
MN 86383		61.0	31.6	37	5	1.56	16.1	69	4	69.3	0.31	15.2	5	4	61.6	5
N 86-370		60.9	25.3	10	7	1.72	16.6	82	4	66.7	0.34	15.8	5	3	64.8	8
N 86-903		61.0	29.1	13	5	1.49	16.1	88	4	67.9	0.32	14.9	5	4	63.6	5
ND 650		61.8	29.5	26	7	1.47	16.6	91	4	68.2	0.33	15.4	5	4	64.8	5
ND 652		61.4	29.0	22	5	1.53	16.5	86	4	69.0	0.32	15.2	5	4	63.9	7
ND 653		60.0	27.0	18	6	1.69	15.8	71	4	70.2	0.30	14.6	5	4	63.1	7
ND 655		61.6	28.4	18	7	1.62	16.5	83	4	69.9	0.31	15.7	5	4	63.9	5
ND 658		61.6	29.0	17	4	1.59	17.0	84	4	70.7	0.30	16.2	5	4	64.2	5
PR 2370		61.3	28.7	9	6	1.42	16.6	86	4	68.2	0.33	15.5	5	4	65.2	8
PR 2375		61.7	31.7	20	5	1.51	16.4	87	4	69.0	0.32	15.2	5	4	62.5	5
SD 3005		60.8	28.6	20	5	1.51	15.8	68	4	69.3	0.28	15.0	5	4	62.2	5
SD 3014		60.6	27.5	7	6	1.48	15.3	77	4	65.5	0.30	14.1	5	3	59.2	4
SD 3026		60.6	29.8	21	4	1.60	16.0	82	4	68.9	0.37	14.7	5	4	63.9	5
SD 3032		61.1	30.4	22	3	1.47	16.7	88	4	68.6	0.33	15.5	5	4	63.7	5
SD 3036		60.8	29.4	15	4	1.41	16.3	81	4	63.2	0.38	14.8	5	2	60.7	4
WA 7493		57.8	27.1	7	8	1.58	15.6	61	4	69.2	0.36	14.8	5	4	62.5	6
WA 7494		57.7	27.4	8	10	1.61	15.7	63	4	69.8	0.35	15.2	5	4	62.8	7



QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 4 (Cont.)

STATE= STATION=NORTHEASTERN AREA NURSERY=BLEND

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----																
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV		
BUTTE 86	S	63.8	3.00	8	101 6	88 4	990	3	3.7																	
CHRIS	S	60.9	2.50	7	100 6	88 6	1000	2	3.3																	
ERA		59.9	4.00	9	101 6	88 6	990	2	3.3			MI								MI	MI					
MARQUIS		59.2	3.00	9	102 8	89 5	985	2	3.3			MI								MJ						
STOA	S	62.7	4.00	9	103 9	87 3	1040	3	3.7			MI														
BW 114		60.7	2.75	9	100 4	87 3	1095	1	3.0											MI	MI					
DA 984-034		63.2	3.25	9	99 8	85 3	1200	3	3.7																	
HS 85-476		62.7	4.00	9	101 7	88 4	1100	3	3.7																	
HS 85-674		61.6	4.00	9	101 7	88 4	1020	2	3.3											MI						
HS 85-902		59.9	4.50	9	101 6	88 6	1005	2	3.3			MI								MJ						
MN 85324		62.7	4.25	4	101 6	87 4	990	1	3.0											MI						
MN 86018		61.5	3.25	4	102 6	88 6	975	1	2.7											MI						
MN 86151		63.1	3.25	9	101 6	88 4	970	3	3.7																	
MN 86329		63.5	2.25	9	102 8	88 4	1060	2	3.0											MI						
MN 86383		61.2	3.75	4	103 9	87 3	1010	1	3.0											MI						
N 86-370		64.3	4.75	4	102 3	87 3	935	1	2.7											MI						
N 86-903		63.2	3.50	4	101 4	88 6	935	1	3.0																	
ND 650		64.0	3.00	9	102 6	87 3	1060	3	3.7																	
ND 652		62.9	3.50	9	103 9	89 10	1065	4	4.0											MI						
ND 653		62.7	4.50	4	101 7	88 4	900	1	3.0											MI						
ND 655		63.9	3.50	9	101 6	90 6	1020	4	4.0																	
ND 658		64.3	3.50	9	101 3	88 4	1040	2	3.3																	
PR 2370		65.2	4.50	4	101 7	88 6	935	1	3.0											MI						
PR 2375		62.4	3.50	9	102 8	87 3	1005	3	3.7																	
SD 3005		62.2	3.00	9	101 7	88 6	1055	4	4.0																	
SD 3014		59.1	4.00	9	100 7	88 4	1020	1	2.7																	
SD 3026		63.7	3.00	9	101 6	88 3	1050	3	3.7											MJ						
SD 3032		63.7	3.25	9	101 6	89 6	920	3	3.7																	
SD 3036		60.4	3.00	8	101 8	89 7	955	1	2.3																	
WA 7493		62.1	4.00	9	103 9	88 3	1100	3	3.7																	
WA 7494		62.5	4.25	9	101 8	87 3	1085	3	3.7											MI						

DEFICIENCIES

MINOR FAULTING VALUES 57.9 24.5 8 13.9 66.8 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 6 8 955  
 MAJOR FAULTING VALUES 56.9 21.5 18 12.9 64.8 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 905

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 5 STATE=, STATION=SOUTHEASTERN AREA NURSERY=BLEND

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	LG %	SIZING SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE 86	S	59.9	31.6	30	2	1.68	16.0	83	4	67.6	0.38	14.5	5	4	62.8	4
CHRIS	S	58.7	24.9	9	3	1.95	16.7	81	4	68.0	0.35	15.4	5	4	60.4	3
ERA		59.1	26.5	13	5	1.91	15.5	78	4	69.3	0.39	13.5	5	4	58.7	4
MARQUIS		57.1	22.9	4	9	1.97	15.3	73	3	68.2	0.42	14.1	5	4	58.7	4
STOA	S	59.3	27.6	13	4	1.68	15.7	75	4	68.2	0.35	14.5	5	4	61.0	5
BW 114		58.3	27.1	10	5	1.80	16.6	81	4	68.3	0.42	15.3	5	4	59.8	3
DA 984-034		57.8	28.0	16	5	1.71	15.6	78	4	67.7	0.41	14.8	5	4	60.1	4
HS 85-476		57.2	30.1	34	3	1.92	16.2	66	4	68.1	0.37	15.7	5	4	62.2	5
HS 85-674		58.0	30.7	23	4	1.81	14.9	60	4	70.7	0.37	14.1	5	4	59.2	5
HS 85-902		58.8	28.7	29	3	1.58	15.4	74	4	68.3	0.36	13.9	5	4	57.5	5
MN 85324		59.4	32.0	33	2	1.70	15.4	73	4	68.3	0.35	14.1	5	4	61.0	5
MN 86018		60.7	30.1	29	2	1.55	15.7	82	4	66.2	0.42	13.9	5	4	60.1	4
MN 86151		57.8	31.5	34	3	1.82	16.0	74	4	68.6	0.39	14.5	5	4	60.7	5
MN 86329		58.3	34.9	55	2	1.88	16.0	78	4	68.9	0.40	14.4	5	4	62.5	4
MN 86383		59.8	32.1	45	1	1.69	15.8	68	4	69.3	0.32	14.6	5	4	59.5	4
N 86-370		59.0	25.3	13	5	1.80	16.4	77	4	66.9	0.42	15.2	5	4	62.8	6
N 86-903		61.0	30.6	19	3	1.78	15.8	82	4	67.0	0.37	14.2	5	4	61.3	4
ND 650		60.5	29.5	34	3	1.72	16.9	93	4	68.0	0.36	15.6	5	4	65.7	5
ND 652		59.2	29.5	30	3	1.89	16.6	86	4	67.9	0.38	15.3	5	4	63.9	6
ND 653		58.6	27.7	15	2	1.80	15.6	70	4	68.1	0.32	14.3	5	4	63.1	5
ND 655		60.6	29.2	21	3	1.68	16.2	77	4	70.1	0.35	15.3	5	4	63.9	5
ND 658		60.6	31.3	26	2	1.68	16.8	78	4	69.9	0.33	15.9	5	4	63.9	5
PR 2370		60.3	30.5	17	4	1.76	16.1	77	4	66.9	0.37	15.1	5	4	64.2	6
PF 2375		60.6	33.4	28	3	1.59	15.8	82	4	67.9	0.57	14.3	5	3	62.8	5
SD 3005		60.5	31.7	33	2	1.50	15.6	66	4	69.6	0.34	14.6	5	4	61.6	4
SD 3014		59.2	29.5	14	3	1.79	15.1	78	4	67.3	0.37	13.6	5	4	60.7	4
SD 3026		60.0	31.5	24	3	1.78	15.4	74	4	68.3	0.41	14.1	5	4	63.6	5
SD 3032		60.1	32.5	26	2	1.63	16.1	80	4	68.8	0.40	14.8	5	4	63.6	5
SD 3036		60.0	32.4	25	2	1.80	16.3	82	4	65.6	0.42	14.7	5	3	61.0	4
WA 7493		57.8	30.5	14	3	1.67	14.3	54	4	69.6	0.38	13.7	5	4	59.5	5
WA 7494		57.3	29.3	12	4	1.65	14.4	55	4	69.9	0.38	13.8	5	4	58.7	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 5 (CONT)

STATE= . STATION=SOUTHEASTERN AREA NURSERY=BLEND

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----																		
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV				
BUTTE 86	S	62.7	2.75	8	100	7	87	4	890	2	3.3																	
CHRIS	S	60.4	2.50	7	100	8	89	8	925	1	3.0																	
ERA		58.6	3.50	6	101	8	88	6	925	2	3.3		MI															
MARQUIS		58.4	3.00	6	100	8	89	10	935	2	3.0																	
STOA	S	60.6	4.00	8	101	8	88	6	980	3	3.7		MI	MJ	MI													
BW 114		59.3	2.75	7	101	6	89	10	940	1	3.0																	
DA 984-034		59.5	3.25	8	101	8	88	6	1040	2	3.3		MI															
HS 85-476		62.1	3.75	9	101	8	88	3	1050	3	3.7		MI															
HS 85-674		58.7	3.25	7	100	7	87	4	985	1	3.0																	
HS 85-902		57.1	4.25	8	101	6	88	6	905	2	3.3																	
MN 85324		60.6	4.00	4	101	8	88	6	975	1	3.0																	
MN 86018		59.7	2.75	8	101	8	87	3	915	1	3.0																	
MN 86151		60.3	3.50	9	100	6	87	74	915	2	3.3		MI															
MN 86329		61.8	2.25	8	101	8	87	3	1035	1	3.0																	
MN 86383		59.0	3.75	8	102	8	89	5	990	2	3.3																	
N 86-370		62.1	4.50	9	100	6	88	6	1010	4	4.0																	
N 86-903		60.9	3.00	9	102	4	88	3	950	2	3.3																	
ND 650		61.3	2.75	9	102	8	88	6	1080	2	3.3																	
ND 652		63.4	3.75	9	102	8	88	6	1005	4	4.0																	
ND 653		62.5	4.00	9	100	8	88	4	1005	3	3.7																	
ND 655		64.0	3.50	9	100	8	88	6	1055	4	4.0																	
ND 658		63.9	3.75	9	100	7	88	4	1070	3	3.7																	
PR 2370		64.1	4.00	9	101	8	89	8	950	4	4.0																	
PR 2375		62.6	3.75	8	101	8	88	6	990	4	3.7																	
SD 3005		61.5	3.25	8	100	7	88	6	1055	3	3.7																	
SD 3014		60.3	3.75	6	101	8	88	5	975	2	3.3																	
SD 3026		63.4	3.00	8	100	7	88	3	920	3	3.7																	
SD 3032		63.2	3.25	9	101	8	89	6	935	4	4.0																	
SD 3036		62.4	2.50	7	101	8	88	3	990	2	3.0																	
WA 7493		59.1	3.75	9	102	8	88	3	995	1	3.0																	
WA 7494		58.3	5.00	9	101	8	88	3	1040	1	3.0																	

DEFICIENCIES  
 MINOR FAULTING VALUES 57.9 25.9 8 13.9 65.8 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 6 8 877  
 MAJOR FAULTING VALUES 56.9 22.9 18 12.9 63.8 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 827

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.



QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE= STATION=MIDWESTERN AREA NURSERY=BLEND

TABLE 6

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE 86	S	60.4	25.8	18	6	1.64	16.5	92	4	69.2	0.37	15.2	5	4	64.8	5
CHRIS	S	59.0	21.0	9	11	1.59	17.1	76	4	67.3	0.37	15.6	5	4	63.1	3
ERA		60.3	24.8	7	10	1.69	15.6	88	4	69.4	0.39	14.7	5	4	65.4	6
MARQUIS		60.5	24.2	4	7	1.72	16.7	88	4	65.6	0.38	15.4	5	3	65.2	5
STOA	S	59.4	24.3	6	13	1.68	16.2	88	4	68.4	0.36	15.2	5	4	63.6	7
BW 114		59.7	24.3	5	14	1.72	17.2	93	4	67.7	0.38	16.3	5	4	66.3	4
DA 984-034		59.8	28.2	16	7	1.68	16.3	84	4	68.8	0.38	15.4	5	4	65.2	5
HS 85-476		58.4	27.7	16	4	1.73	16.5	75	4	71.0	0.37	16.3	5	4	64.8	7
HS 85-674		58.9	28.9	15	9	1.63	15.7	68	4	69.8	0.34	15.4	5	4	65.2	8
HS 85-902		60.3	28.9	24	5	1.63	16.3	92	4	67.9	0.37	15.2	5	4	62.2	4
MN 85324		59.6	29.5	20	5	1.54	15.8	83	4	68.8	0.36	14.9	5	4	63.3	7
MN 86018		61.0	27.3	15	7	1.56	15.9	90	4	66.6	0.40	14.6	5	4	62.8	4
MN 86151		58.2	28.0	14	10	1.71	16.9	85	4	69.9	0.35	15.7	5	4	64.2	5
MN 86329		59.7	31.2	31	3	1.80	16.9	92	4	66.9	0.50	15.7	5	4	64.5	4
MN 86383		60.0	29.3	24	5	1.62	16.4	72	4	68.8	0.35	16.0	5	4	60.7	4
N 86-370		60.7	24.3	15	10	1.64	16.8	89	4	65.1	0.41	15.9	5	3	64.8	6
N 86-903		60.9	27.8	17	9	1.55	16.6	94	4	66.8	0.38	15.3	5	4	64.5	5
ND 650		61.9	27.2	15	4	1.69	16.6	96	4	67.7	0.46	15.3	5	4	64.5	4
ND 652		60.9	26.6	15	6	1.62	16.3	94	4	69.0	0.36	15.4	5	4	64.2	6
ND 653		60.4	25.3	10	7	1.55	16.0	74	4	69.7	0.31	15.0	5	4	63.3	7
ND 655		61.5	26.8	16	7	1.68	16.8	89	4	70.2	0.32	16.2	5	4	65.2	5
ND 658		61.1	27.1	8	6	1.60	17.0	88	4	70.2	0.31	16.4	5	4	66.3	8
PR 2370		60.7	29.2	15	9	1.64	17.6	92	4	67.7	0.55	16.5	5	3	67.2	8
PR 2375		60.7	30.5	19	7	1.53	16.4	89	4	68.5	0.37	15.3	5	4	65.4	6
SD 3005		59.7	25.2	18	8	1.69	16.0	71	4	69.0	0.29	15.6	5	4	65.2	5
SD 3014		59.4	25.6	10	18	1.98	16.1	83	3	67.6	0.34	14.9	5	4	63.9	7
SD 3026		60.0	29.2	19	7	1.66	16.1	84	4	68.3	0.39	14.8	5	4	66.6	6
SD 3032		60.0	29.2	19	7	1.54	16.1	84	4	67.9	0.37	15.8	5	4	65.7	6
SD 3036		61.1	27.2	15	5	1.58	16.9	92	4	64.5	0.41	15.6	5	3	63.6	5
WA 7493		57.9	29.1	16	14	1.53	15.6	62	4	69.8	0.31	15.4	5	4	63.6	7
WA 7494		57.6	28.6	17	14	1.58	15.8	63	4	70.0	0.30	15.3	5	4	63.1	7

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE= STATION=MIDWESTERN AREA NURSERY=BLEND

TABLE 6 (Cont.)

VARIETY	STD	BAKE ABS &	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----																
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV		
BUTTE 86	S	64.7	2.50	7	101 7	88	4	1050	3.3																	
CHRIS	S	63.0	2.25	7	100 4	88	4	1090	2		MI	MI								MI						
ERA		65.3	3.25	9	100 4	87	4	1000	3		MI									MI						
MARQUIS		64.8	2.50	9	100 4	87	4	1020	2				MI							MI						
STOA	S	63.4	3.25	9	100 6	87	4	1005	3		MI									MI						
BW 114		63.0	1.75	9	100 6	89	10	1050	2		MI									MJ						
DA 984-034		64.7	2.00	8	101 8	89	10	1140	3											MI						
HS 85-476		64.2	3.75	9	102 8	88	6	1200	4																	
HS 85-674		64.7	4.25	3	100 6	88	8	1000	2		MI									MI						
HS 85-902		61.8	3.25	8	101 7	87	3	1045	2																	
MN 85324		62.9	3.50	4	101 6	88	4	985	1											MI						
MN 86018		61.3	3.00	8	101 8	88	6	980	2											MI						
MN 86151		63.7	2.75	4	102 8	87	3	1045	1		MI									MI						
MN 86329		64.0	2.00	8	103 9	87	3	1110	2																	
MN 86383		60.2	2.50	8	102 8	87	3	1060	1																	
N 86-370		64.2	3.50	4	100 4	87	3	1035	1			MI														
N 86-903		64.0	2.75	3	102 3	88	1	850	1		MI									MI						
ND 650		64.0	2.25	9	101 7	88	3	1050	2											MI						
ND 652		63.8	3.25	9	102 6	88	4	1130	3																	
ND 653		62.9	3.50	9	102 7	88	4	1040	3																	
ND 655		64.9	3.25	9	102 8	87	3	1195	3																	
ND 658		65.8	3.25	9	103 8	88	4	1080	3																	
PR 2370		64.7	2.75	3	100 4	85	1	820	1																	
PR 2375		64.8	3.00	9	101 8	88	4	1050	3																	
SD 3005		62.7	2.50	9	101 8	89	7	1045	3																	
SD 3014		63.3	3.50	4	101 6	87	3	1055	1																	
SD 3026		64.1	2.50	8	101 4	89	10	965	2																	
SD 3032		65.0	2.25	9	101 4	88	3	1065	2																	
SD 3036		63.0	2.25	8	101 6	86	3	990	1																	
WA 7493		63.0	3.25	9	101 8	90	13	1055	4																	
WA 7494		63.0	3.25	9	101 8	87	4	1085	3																	

DEFICIENCIES TW KW SM WP EX A65 FP MC MX BA MIX TIME (MT) DC CC CG LV  
 MINOR FAULTING VALUES 57.9 21.6 8 13.9 66.2 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 8 993  
 MAJOR FAULTING VALUES 56.9 18.6 18 12.9 64.2 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 943

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

# QUALITY DATA OF SPRING WHEAT SAMPLES

TABLE 7

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
AMIDON		57.9	22.1	1	14	1.40	18.4	100	3	65.1	0.52	17.2	4	2	65.7	5
LEN		58.2	22.7	2	10	1.56	18.4	80	3	55.2	0.67	17.8	3	1	66.1	6
NO DAK	STD	62.7	31.8	41	2	1.56	15.5	92	4	69.3	0.43	14.9	5	4	63.3	6

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES
										TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV

						63.7	3.00	8	100	3	87	4	176	2	2.3	MI	MJ	MI	MJ	MJ
						66.1	5.25	8	100	3	87	4	188	2	2.0	MJ	MI	MJ	MJ	MJ
						63.3	4.50	8	100	4	87	6	180	4	4.0	MI	MJ	MI	MI	MI
																	</			

DEFICIENCIES		TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING	VALUES	57.9	29.7	8	13.9	67.2	.57	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8	159
MAJOR FAULTING	VALUES	56.9	26.7	18	12.9	65.2	.61	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	149

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.



STATE=WISCONSIN STATION=MADISON NURSERY=UNIFORM

TABLE 8

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
AMIDON		56.6	26.8	20	4	1.82	17.0	87	3	73.8	0.72	16.4	5	3	64.8	4
BUTTE		58.2	28.2	26	2	1.73	16.3	68	4	65.1	0.46	15.3	4	2	63.6	6
GRANDIN		56.9	31.0	49	1	1.88	16.9	76	3	64.5	0.53	15.9	4	2	63.1	6
GUARD		56.2	27.0	27	2	1.96	15.8	67	3	59.9	0.60	14.4	3	1	60.1	6
GUS		57.0	25.6	21	4	1.91	17.1	76	3	71.2	0.69	16.7	5	3	66.1	5
MARSHALL		56.7	20.9	20	5	2.07	16.0	58	2	65.6	0.50	14.3	4	3	60.1	4
MINNPRO		53.7	28.2	34	2	2.01	17.8	70	3	61.7	0.55	17.1	4	2	64.5	5
NORDIC		57.9	30.5	36	4	1.80	14.6	65	4	61.4	0.48	13.1	4	2	59.8	4
PROSPECT		56.5	27.1	16	4	1.89	15.7	65	3	65.4	0.63	14.9	4	2	61.6	3
VANCE		54.2	27.1	21	3	1.88	16.5	60	3	61.3	0.47	15.5	4	2	60.7	5
NO DAK STD LEN	S	62.7	31.8	41	2	1.56	15.5	92	4	69.3	0.43	14.9	5	4	63.3	6

BAKE MIX DOUGH CRUMB COLOR CRUMB GRAIN LOAF VOL BAKE SCORE GENERAL SCORE \*\*\*

TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV

DEFICIENCIES

AMIDON	62.8	2.75	6	100	0	87	4	167	1	2.3	MJ	MI	MJ	MI	MI	MJ	MJ
BUTTE	63.6	4.00	8	100	4	88	6	181	4	3.3	MI		MJ		MI	MI	MI
GRANDIN	63.1	5.00	8	101	8	87	3	185	3	2.7	MJ		MJ			MJ	MJ
GUARD	60.1	5.25	7	100	8	88	6	186	2	2.0	MJ	MI	MJ	MI		MJ	MI
GUS	64.1	3.25	6	100	0	87	4	172	2	2.7	MI	MJ	MJ		MI	MJ	MJ
MARSHALL	60.1	3.75	9	100	8	87	4	186	1	2.0	MJ	MJ	MI		MJ	MJ	MJ
MINNPRO	62.5	3.50	9	101	6	88	6	180	4	3.0	MJ	MI	MJ		MI	MI	MI
NORDIC	59.8	4.00	8	100	8	88	4	188	1	2.3	MI		MJ		MJ	MJ	MJ
PROSPECT	59.6	2.75	5	101	6	87	4	179	1	2.0	MJ	MI	MI	MJ	MJ	MI	MI
VANCE	59.7	3.25	6	100	4	87	3	174	1	2.0	MJ	MI	MJ		MJ	MI	MI
NO DAK STD LEN	S	63.3	4.50	8	100	4	87	6	4	4.0					MI	MI	MI

DEFICIENCIES

MINOR FAULTING VALUES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV
57.9	29.7	8	13.9	67.2	.57	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8	159
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	65.2	.61	12.4	2	1,9-11	60.4	UNDER 1.75 OVER 8.00	4	3	4	149

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=IDAHO STATION=TETONIA NURSERY=UNIFORM

TABLE 9

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT- SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
COPPER		60.1	36.4	59	0	1.47	13.3	68	3	60.8	0.40	12.5	4	1	59.2	2
PONDERA		61.9	31.5	21	0	1.58	15.0	80	4	63.0	0.43	14.5	4	2	63.3	3
IDO 312		62.2	34.2	49	2	1.33	10.6	16	2	54.6	0.37	9.3	0	1	50.5	1
IDO-341		61.2	31.5	40	2	1.56	14.1	66	4	55.1	0.49	13.6	0	1	61.0	4
NO DAK STD LEN	S	62.7	31.8	41	2	1.56	15.5	92	4	69.3	0.43	14.9	5	4	63.3	6

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----															
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV	

COPPER		57.2	2.50	6	101	8	88	4	169	1	1.7	MI	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
PONDERA		59.3	2.25	7	102	8	89	6	174	1	2.3		MJ												
IDO 312		54.8	1.75	5	100	7	87	3	162	1	1.3		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ
IDO-341		59.0	3.25	7	102	9	88	4	195	1	2.0		MJ												
NO DAK STD LEN	S	63.3	4.50	8	100	4	87	6	180	4	4.0														

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)						DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	67.2	.57	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8	159				
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	65.2	.61	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	149				

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=IDAHO STATION=ABERDEEN NURSERY=UNIFORM

TABLE 10

VARIETY	STD	TEST WT #/BU	1000 LG %	SIZING SM %	WHT ASH %	WHT PRO %	HARD-NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	ABS %	MIX PAT
COPPER		60.9	36.1	44	2	1.54	13.5	69	3	64.0	0.38	12.4	4	60.1	4
PONDERA		61.8	32.2	13	3	1.54	13.7	68	3	63.0	0.45	13.1	4	62.2	4
IDO 312		61.6	36.0	40	2	1.50	11.4	20	2	50.0	0.45	10.3	0	53.3	1
IDO 341		61.0	32.7	37	3	1.64	14.9	73	4	60.7	0.45	13.8	4	60.4	4
NO DAK STD LEN S		62.7	31.8	41	3	1.56	15.5	92	4	69.3	0.43	14.9	5	63.3	6

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	DC	CC	CG	LV
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COPPER		60.1	3.50	6	100	7	87	7	195	2	2.0			MI	MJ					MJ				MI
PONDERA		60.2	2.75	8	102	8	88	3	202	1	2.0			MI	MJ					MJ				MJ
IDO 312		52.8	2.00	2	100	4	87	7	187	1	1.3			MJ	MJ					MJ				MI
IDO 341		58.4	3.50	6	101	8	87	7	192	2	2.7													MI
NO DAK STD LEN S		63.3	4.50	8	100	4	87	6	180	4	4.0													MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	67.2	.57	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	65.2	.61	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.



QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=WASHINGTON STATION=PULLMAN NURSERY=UNIFORM

TABLE 11

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT- SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT	
COPPER		57.0	26.7	6	8	1.48	14.6	63	4	60.3	0.42	14.1	4	2	60.4	6
EDWALL		54.7	25.6	3	8	1.45	13.4	21	1	41.1	0.50	12.5	0	1	53.9	1
SPILLMAN		54.5	24.5	3	9	1.63	15.5	66	2	59.7	0.48	15.1	3	1	61.6	4
SD 2961		58.4	26.5	3	6	1.38	15.1	66	3	60.2	0.40	14.9	4	2	61.3	9
WPB 906		57.6	30.0	10	3	1.53	15.3	66	4	58.5	0.46	14.8	3	1	61.6	5
NO DAK STD LEN	S	62.7	31.8	41	2	1.56	15.5	92	4	69.3	0.43	14.9	5	4	63.3	6

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----														
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV

COPPER		58.4	4.75	9	101	6	89	6	193	2	2.7	MI	MI	MI	MJ	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI
EDWALL		52.9	2.50	2	100	4	88	7	176	1	1.0	MJ	MJ	MI	MJ	MI	MJ	MJ	MJ	MI	MJ	MI	MI	MI
SPILLMAN		59.3	3.75	7	100	4	87	3	195	1	1.3	MJ	MJ	MI	MJ	MI	MJ	MJ	MJ	MI	MJ	MI	MJ	MJ
SD 2961		61.3	7.75	9	100	7	88	6	195	1	2.0	MJ	MJ	MJ	MJ	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI
WPB 906		59.6	4.50	8	100	8	87	6	184	2	2.3	MI		MJ	MI	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI
NO DAK STD LEN	S	63.3	4.50	8	100	4	87	6	180	4	4.0													

DEFICIENCIES																	
	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)			DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	67.2	.57	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8	159	
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	65.2	.61	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	149	

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 12

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD PLOTS

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG	WHT SM	WHT ASH	WHT PRO	HARD- NESS	WHEAT SCORE ***	FLR EXT	ASH @ 65%	FLR PRO	MILL CHAR	MILL SCORE ***	MIX ABS	MIX PAT
ALEX		63.7	31.4	34	1	1.44	14.9	90	4	70.2	0.32	14.3	5	3	62.5	6
BUTTE 86		63.0	30.1	32	1	1.27	15.0	96	4	70.9	0.33	13.8	5	4	62.8	5
COTEAU		61.9	29.7	12	1	1.45	16.5	95	4	69.5	0.33	15.8	4	3	63.3	3
LEN		63.3	34.4	57	1	1.37	15.4	86	4	71.8	0.32	14.4	2	2	63.9	6
MARSHALL		63.2	31.9	34	1	1.43	14.7	79	4	73.1	0.34	14.1	5	4	63.9	4
STOA		62.8	28.3	13	2	1.36	14.7	94	4	71.0	0.32	14.0	5	4	62.8	6
NO DAK STD	S	62.7	31.8	41	2	1.56	15.5	87	4	72.4	0.35	14.4	5	4	62.8	6

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD PLOTS

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
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ALEX		60.5	4.00	9	101	7	87	4	900	2	3.0			MI					MI					MJ
BUTTE 86		59.7	3.25	7	101	7	88	4	885	1	3.0								MJ					MJ
COTEAU		59.2	2.25	7	100	6	87	3	815	1	2.7			MI					MJ	MI				MI
LEN		62.9	4.00	9	101	6	88	6	965	4	3.3													MI
MARSHALL		59.9	3.25	9	101	8	87	3	960	1	3.0								MJ					MI
STOA		61.8	4.25	9	100	8	88	5	905	3	3.7								MI					MI
NO DAK STD	S	61.8	4.25	8	100	4	88	4	875	2	3.3								MI					MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)			DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	70.3	.47	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75		6	6	8	820
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	68.3	.51	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00		4	3	4	770

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 13

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT	
BUTTE		61.8	29.6	7	2	1.74	16.2	91	4	67.3	0.35	15.0	4	2	64.2	3
LEN		62.2	29.8	17	2	1.70	15.9	83	4	70.3	0.37	14.7	5	3	65.4	5
MARSHALL		62.1	26.1	2	3	1.68	14.9	83	3	71.6	0.37	14.2	5	4	62.2	4
STOA		61.7	26.0	2	4	2.00	15.9	89	3	69.5	0.36	14.8	5	3	63.1	7
NO DAK STD	S	62.7	31.8	4	12	1.56	15.5	87	4	72.4	0.35	14.4	5	4	62.8	6

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----																

BUTTE		63.0	2.25	7	101	4	88	4	775	1	2.3															
LEN		64.5	3.00	8	100	4	87	3	875	3	3.3															
MARSHALL		61.2	3.00	8	100	7	88	4	885	2	3.0															
STOA		59.8	4.25	9	100	7	89	6	890	2	2.7															
NO DAK STD	S	61.8	4.25	8	100	4	88	4	875	2	3.3															

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	70.3	.47	12.9	3	2,7,8	61.9	5.75-8.00	6	6	8	820
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	68.3	.51	12.4	2	1,9-11	60.4	UNDER 1.75 OVER 8.00	4	3	4	770

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.



QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

TABLE 14 STATE=NORTH DAKOTA STATION=LANGDON NURSERY=FIELD PLOTS

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT SM %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
LEN		61.8	31.2	32	3	1.68	14.6	79	4	71.6	0.37	13.7	5	4	62.2	5
MARSHALL		59.1	23.6	2	9	1.84	14.6	75	3	69.6	0.41	13.9	5	3	59.8	4
STOA		59.4	25.3	5	6	1.65	15.9	78	3	68.1	0.38	15.1	4	2	63.9	7
NO DAK STD	S	62.7	31.8	41	2	1.56	15.5	87	4	72.4	0.35	14.4	5	4	62.8	6

QUALITY DATA OF SPRING WHEAT SAMPLES 1989 CROP

STATE=NORTH DAKOTA STATION=LANGDON NURSERY=FIELD PLOTS

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----									
										TW KW SM WP EX A65 FP MC MX BA MT DC CC CG LV									

LEN		61.3	4.25	8	101	6	88	6	905	3	3.7							MI	MI
MARSHALL		57.1	3.50	7	102	5	88	6	875	2	2.7							MJ	MI
STOA		62.8	4.50	8	101	4	86	3	885	3	2.7							MI	MJ
NO DAK STD	S	61.8	4.25	8	100	4	88	4	875	2	3.3							MI	MJ

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)				DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.7	8	13.9	70.3	.47	12.9	3	2,7,8	61.9	5.75-8.00 2.00-2.75				6	6	8	820
MAJOR FAULTING VALUES	56.9	26.7	18	12.9	68.3	.51	12.4	2	1,9-11	60.4	UNDER 1.75 OVER 8.00				4	3	4	770

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

TABLE 15 STATE=CALIFORNIA STATION=IMPERIAL VALLEY NURSERY=FIELD PLOTS

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	WHT ASH %	WHT PRO %	HARD- NESS	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
ANZA		65.1	35.7	57	1	1.50	11.4	87	73.5	0.31	10.0	5	2	54.8	1
BAKER		64.6	41.8	51	1	1.55	13.7	82	72.5	0.33	12.6	5	3	57.8	2
KLASIC		64.9	41.3	68	1	1.41	13.2	67	74.9	0.29	12.4	5	2	55.1	1
PROBRAND 775		62.5	31.6	20	7	1.68	12.7	76	73.3	0.35	11.8	5	2	59.2	5
PROBRED		63.8	41.0	43	3	1.50	12.9	83	72.1	0.35	11.6	5	2	57.5	5
PHOENIX		65.1	38.2	61	2	1.61	11.4	80	74.5	0.28	10.3	5	2	56.0	1
TADINA		63.5	31.4	39	2	1.56	12.2	85	71.1	0.34	10.7	5	2	53.3	1
YECORO ROJO	S	64.0	39.5	42	3	1.54	13.0	80	72.3	0.36	12.0	5	2	57.2	6
YECORO ROJO 87W		64.7	38.2	61	1	1.63	12.7	85	70.8	0.35	11.3	5	2	59.5	4
YOLO		64.5	31.4	31	1	1.49	11.4	73	73.5	0.31	10.4	5	2	58.9	2
DA 984-034		65.2	41.8	76	1	1.61	13.4	89	70.8	0.31	12.0	5	2	62.5	4
DA 984-039		65.1	39.7	71	1	1.50	13.3	100	69.5	0.39	12.2	4	1	62.5	4
DA 984-146		63.1	33.6	43	2	1.67	13.4	81	70.1	0.31	12.2	5	1	58.7	4
ESCA 2		64.5	39.4	65	2	1.58	13.3	98	71.1	0.39	11.7	5	2	60.7	5
ESCA 4		64.7	40.2	70	1	1.61	12.9	91	70.7	0.37	12.0	5	2	60.4	4
ESCA 5		65.1	41.3	74	0	1.58	13.2	92	71.2	0.38	12.3	5	2	61.0	4
ESCA 32		64.0	34.8	53	2	1.62	12.8	80	72.3	0.29	11.3	5	2	58.7	4
FMC BR 5144		64.3	35.0	50	1	1.48	11.5	74	73.8	0.31	10.2	5	2	57.5	2
FMC BR 5236		62.6	35.0	36	3	1.57	13.0	65	72.3	0.30	12.0	5	2	56.6	4
FMC BR 5450		65.2	40.7	60	1	1.55	12.8	67	73.7	0.28	12.1	5	2	58.9	4
FMC BR 5678		63.5	36.9	46	2	1.63	12.4	79	71.8	0.35	11.5	5	2	57.2	4
FMC BR 5784		62.5	35.5	43	2	1.62	11.6	87	73.4	0.35	9.9	5	2	58.3	4
PB BR 5702		63.7	41.5	61	0	1.57	13.2	79	71.9	0.34	12.0	5	2	58.7	4
PB BR 5710		63.5	38.6	44	0	1.61	13.4	79	71.5	0.32	12.5	5	3	58.9	5
PB BR 5738		63.1	35.7	21	4	1.61	13.3	73	70.6	0.36	12.7	5	3	60.1	5
PB BR 5762		62.3	37.0	26	2	1.65	12.7	89	71.4	0.35	11.4	5	2	57.2	4
QT 555		63.8	31.9	21	2	1.75	12.0	73	70.4	0.39	11.0	5	2	56.9	3
QT 562		63.1	30.4	19	5	1.78	12.2	73	68.9	0.38	10.8	5	1	58.9	3
QT 574		63.8	33.9	30	3	1.70	12.2	76	69.3	0.40	11.1	5	1	57.2	3
QT 578		64.3	32.8	20	2	1.68	12.0	73	70.1	0.38	10.6	5	1	58.1	3
QT 588		64.5	35.6	39	2	1.57	11.2	64	72.6	0.34	10.8	5	2	56.6	3
S 8330501		64.3	36.4	48	2	1.54	12.5	77	71.1	0.42	11.5	5	2	58.1	3
UC 638		64.4	39.5	55	1	1.60	12.2	72	73.9	0.34	11.4	5	2	57.5	4
UC 784		64.3	41.7	62	0	1.57	12.6	84	71.8	0.39	11.2	5	2	58.1	3
UC 785		64.2	41.0	53	2	1.58	12.6	90	71.1	0.39	11.3	5	2	56.6	4
UC 786		64.5	38.6	50	2	1.55	12.3	81	71.1	0.37	11.3	5	2	58.1	4
UC 839		63.6	32.8	39	3	1.64	11.9	76	69.2	0.34	10.2	5	1	54.5	1
UC 840		64.5	41.8	65	1	1.60	12.0	79	70.6	0.34	10.5	5	2	54.8	3
UC 842		63.1	35.6	32	3	1.59	13.1	78	71.9	0.32	12.1	5	2	58.1	5
UC 843		62.7	35.1	28	2	1.58	13.1	81	72.0	0.33	12.2	5	2	57.8	5
UC 844		61.4	30.1	27	6	1.75	13.8	82	68.4	0.37	12.8	5	2	58.1	5
UC 845		65.4	38.2	62	0	1.54	13.0	75	73.9	0.33	12.2	5	2	60.1	3
UC 849		64.8	32.6	37	2	1.60	13.4	82	72.5	0.34	12.3	5	2	60.1	4
UC 851		65.1	38.3	54	1	1.55	12.4	77	70.7	0.35	10.9	5	2	58.7	4



TABLE 15 (CONT)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	-----DEFICIENCIES-----																					
										TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)	DC	CC	CG	LV							
ANZA		57.4	2.00	0	100	7	86	3	620	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ					
BAKER		59.6	4.50	8	101	8	87	4	850	1	2.3		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
KLASIC		56.3	5.25	8	100	7	86	3	855	1	2.0		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
PROBRAND 775		58.2	4.25	7	102	4	88	6	785	2	1.7	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
PROBRED		58.5	4.50	7	102	8	88	6	800	2	2.0		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
PHOENIX		57.0	2.00	1	100	7	88	6	680	1	1.7		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
TADINA		56.3	2.75	1	100	7	88	6	680	1	1.3		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
YECORO ROJO	S	59.5	5.50	7	100	7	87	4	820	1	2.0		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
YECORO ROJO 87W		61.4	4.25	7	100	7	88	6	810	3	2.3		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
YOLO		57.8	2.00	2	102	4	89	10	765	1	1.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
DA 984-034		63.0	2.75	7	101	7	88	6	885	3	2.7		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
DA 984-039		61.9	2.75	7	101	6	88	6	885	2	2.0		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
DA 984-146		61.6	4.25	8	100	7	87	4	850	2	1.7	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
ESCA 2		62.3	4.25	8	100	7	87	6	865	4	3.0		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
ESCA 4		62.3	2.75	8	102	8	88	6	865	3	2.3		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
ESCA 5		61.8	2.75	7	101	6	87	5	860	2	2.3		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
ESCA 32		59.0	3.50	8	101	7	87	4	830	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI						
FMC BR 5144		56.1	2.00	2	100	6	88	6	760	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
FMC BR 5236		58.3	4.25	5	101	7	88	6	845	2	2.3	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
FMC BR 5450		58.0	4.00	7	100	7	88	6	825	2	2.0		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
FMC BR 5678		57.0	5.75	7	102	8	88	6	800	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
FMC BR 5784		59.0	4.75	1	101	8	87	6	750	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
PB BR 5702		58.8	5.50	5	100	7	88	6	765	1	2.0		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
PB BR 5710		58.9	4.75	7	100	8	87	6	860	2	2.7		MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI					
PB BR 5738		60.1	4.75	4	100	7	88	4	830	1	2.3	MI	MI	MI	MI	MI	MI	MI	MI	MI	MJ	MJ	MI	MI	MI						
PB BR 5762		58.2	6.50	7	100	7	88	6	780	1	1.7	MI	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
QT 555		56.9	3.75	5	100	4	88	6	725	1	1.3	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
QT 562		58.9	2.75	6	100	4	89	8	775	1	1.0	MJ	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
QT 574		58.2	3.50	6	100	7	87	4	790	1	1.0	MJ	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
QT 578		58.6	2.75	5	100	7	88	6	765	1	1.0	MJ	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
QT 588		56.6	2.50	5	100	7	87	4	730	1	1.7	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
S 8330501		59.1	2.75	5	100	4	87	3	760	1	1.7	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
UC 638		57.5	5.00	8	101	8	87	3	815	1	1.7		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
UC 784		58.7	3.75	5	101	8	88	6	740	1	1.7		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
UC 785		59.1	3.50	7	100	8	87	4	775	1	1.7		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
UC 786		58.7	4.00	8	100	7	88	6	825	2	2.0		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI						
UC 839		58.0	7.00	1	99	7	86	1	625	1	1.0	MJ	MJ	MJ	MJ	MI	MI	MI	MI	MI	MJ	MI	MI	MI	MI						
UC 840		60.8	3.00	2	99	7	86	2	680	1	1.7	MI	MJ	MJ	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
UC 842		59.6	4.75	8	99	7	88	6	790	2	2.3	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
UC 843		60.1	5.25	7	100	7	87	3	785	1	2.0	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
UC 844		61.2	5.00	8	100	8	87	4	820	2	2.0	MJ	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI						
UC 845		60.1	2.25	8	100	6	88	6	815	1	2.0		MI	MI	MI	MI	MI	MI	MI	MI	MJ	MI	MI	MI	MI						
UC 849		60.1	3.25	8	100	6	87	5	820	2	2.0	MJ	MI	MI	MI	MI	MI	MI	MI	MJ	MJ	MI	MI	MI	MI						
UC 851		60.9	2.75	6	100	7	88	6	755	1	1.7		MJ	MJ	MJ	MJ	MJ	MJ	MJ	MJ	MI	MI	MI	MI	MI						
DEFICIENCIES																															
MINOR FAULTING VALUES																57.9	37.4	8	13.9	70.2	.47	12.9	3	2,7,8	61.9	5.75-8.00	2.00-2.75	6	6	8	765
MAJOR FAULTING VALUES																56.9	34.4	18	12.9	68.2	.51	12.4	2	1,9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	715

DEFICIENCIES

TW

KW

SM

WP

EX

A65

FP

MC

MX

BA

MIX TIME (MT)

DC

CC

CG

LV

MINOR FAULTING VALUES 57.9 37.4 8 13.9 70.2 .47 12.9 3 2,7,8 61.9 5.75-8.00 2.00-2.75 6 8 765  
MAJOR FAULTING VALUES 56.9 34.4 18 12.9 68.2 .51 12.4 2 1,9-11 60.4 UNDER 1.75 OVER 8.00 4 3 4 715

\*\*\* 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.









